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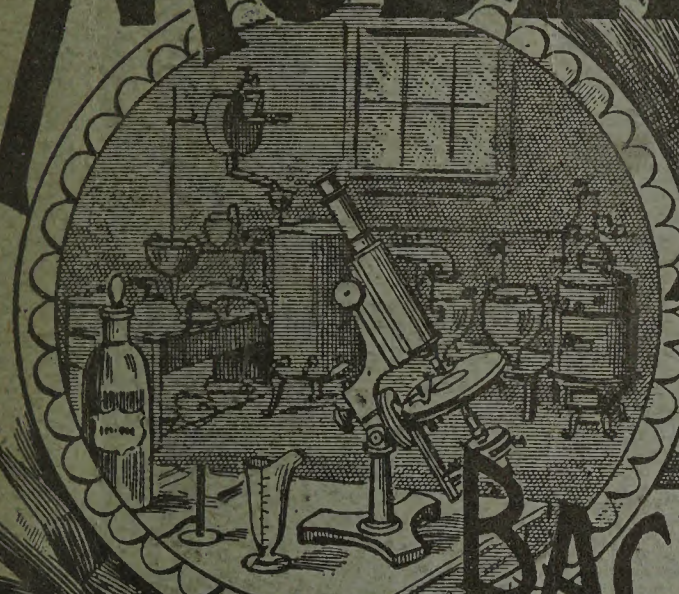
MODERN MEDICINE AND BACTERIOLOGICAL REVIEW.



Bulletin of the Sanitarium Hospital and Laboratory of Hygiene.
SANITARIUM, BATTLE CREEK, MICH.

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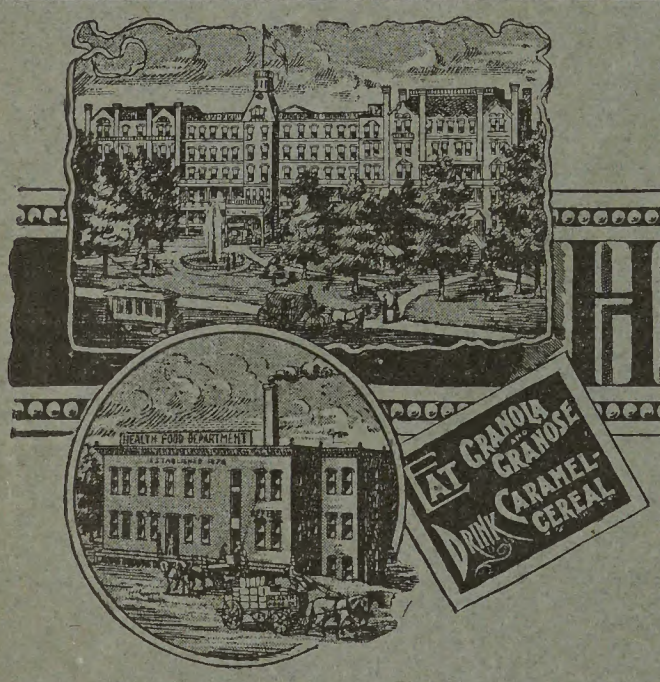

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The special opportunities afforded the author as superintendent of the Battle Creek Sanitarium, and of the research laboratories connected with the institution, have enabled him to make a most exhaustive study of this subject; and he has undertaken to present in this little work the results of more than twenty years' investigation and experience in the treatment of the various forms of the disease commonly known as "dyspepsia."

The work is thoroughly practical, first giving a brief but very complete account of the process of digestion and the composition of food, then considering the various causes of indigestion, and afterward taking up, one by one, the leading symptoms of indigestion and the several varieties of dyspepsia, together with the appropriate treatment of each. Careful directions are given for the application of all the different remedies recommended, which include more than twenty carefully prepared Diet Lists.

The work concludes with an explanation of the new and elaborate method of investigating disorders of the stomach, in use at the Battle Creek Sanitarium, and is largely the result of researches undertaken there. The following is the list of the leading sections in the book: The Organs of Digestion; Foods; The Digestive Fluids; General View of the Digestive Process; The Maladies of the Modern Stomach; Important New Discoveries Relating to Digestion; Symptoms of Dyspepsia; The Symptomatic Treatment of Indigestion; Remedies for the Home Treatment of Dyspepsia; Quacks and Nostrums; Explanation of the Author's Graphic Mode of Representing the Results of Stomach Work, Obtainable from Examination of the Stomach Fluid by the System of Investigation Employed in the Hygienic and Research Laboratories of the Sanitarium at Battle Creek, Mich., U. S. A.

The work describes such of the various methods of treatment employed at the Battle Creek Sanitarium in the treatment of digestive disorders as can be carried out by the individual at home, giving especial attention to those which experience has shown to be the most essential and efficient.

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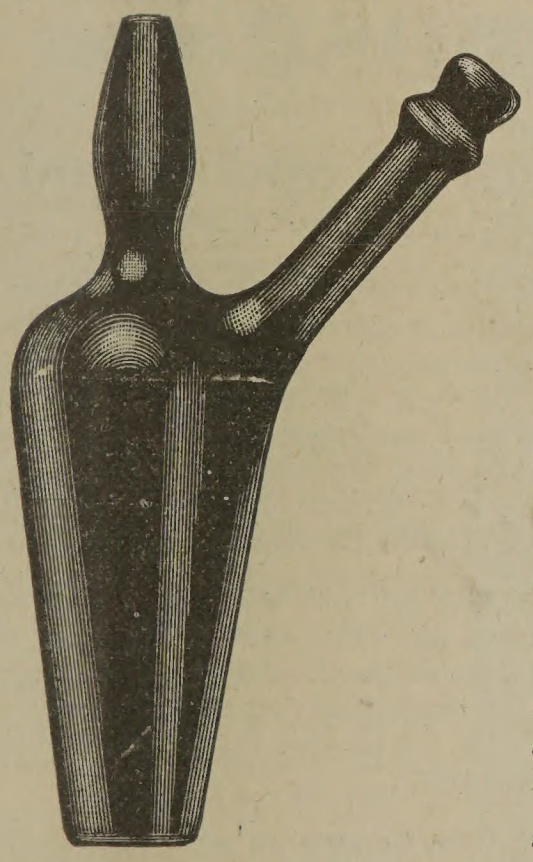

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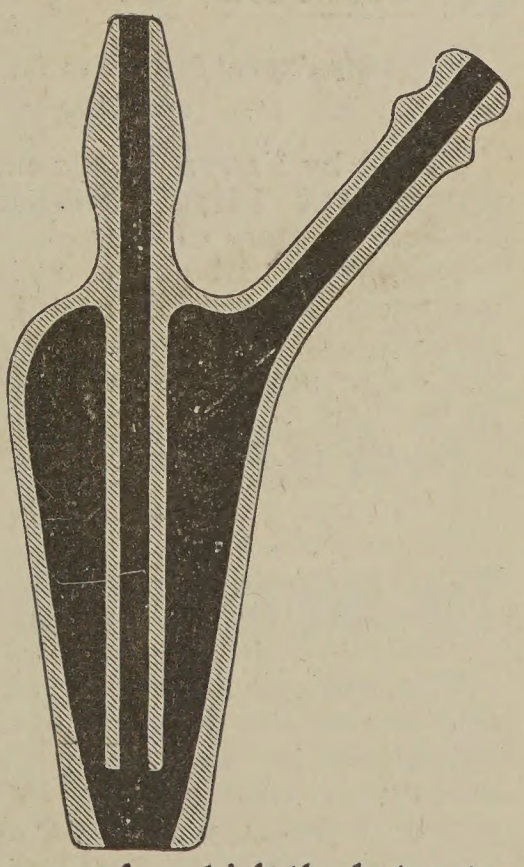

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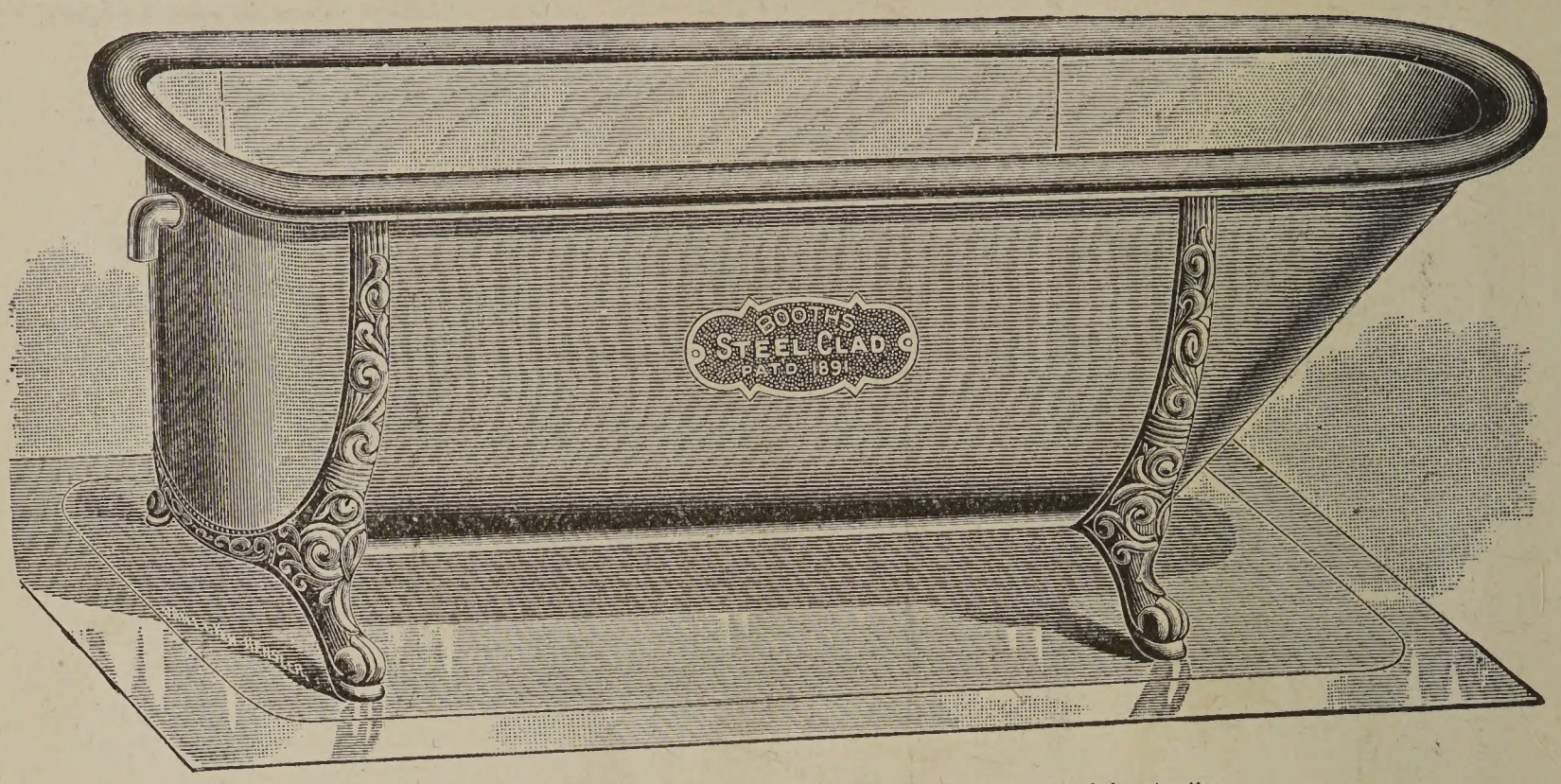

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11.25	5.05	10.30	6.00	.....	.....Valparaiso.....	5.05	11.35	7.10	.....	5.45
p m										
1.05	6.30	12.00	10.05	.....	.....South Bend.....	3.10	10.15	5.44	.....	4.10
1.46	7.12	12.45	12.40	.....	.....Cassopolis	2.15	9.40	5.13	.....	3.28
2.33	.....	†1.33	3.42	.....	.....Schoolcraft.....	1.20	.....	.....	.....	.....
2.44	7.55	1.48	4.30	a m	.....Vicksburg.....	1.10	8.52	.....	p m	2.37
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9.25	.....	.....	.....	.....	..... Detroit.....	.....	.....	10.40	4.05	8.45
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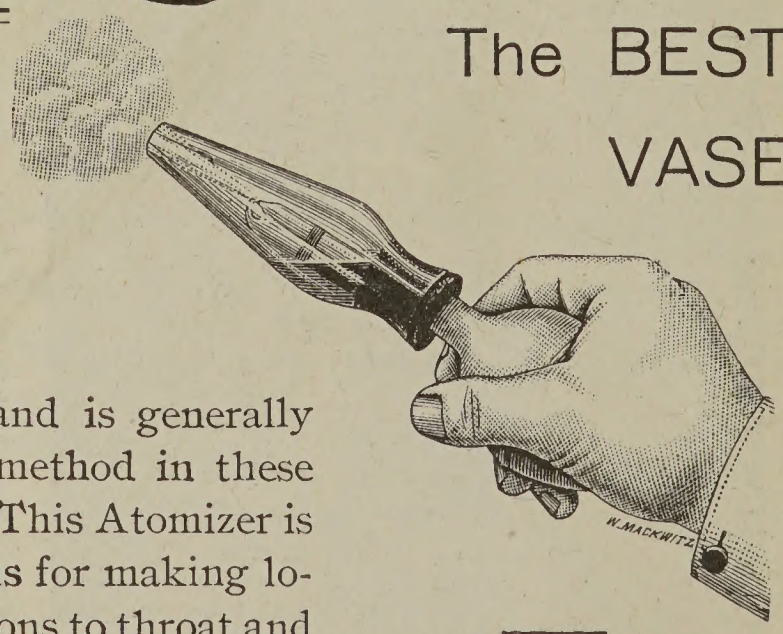

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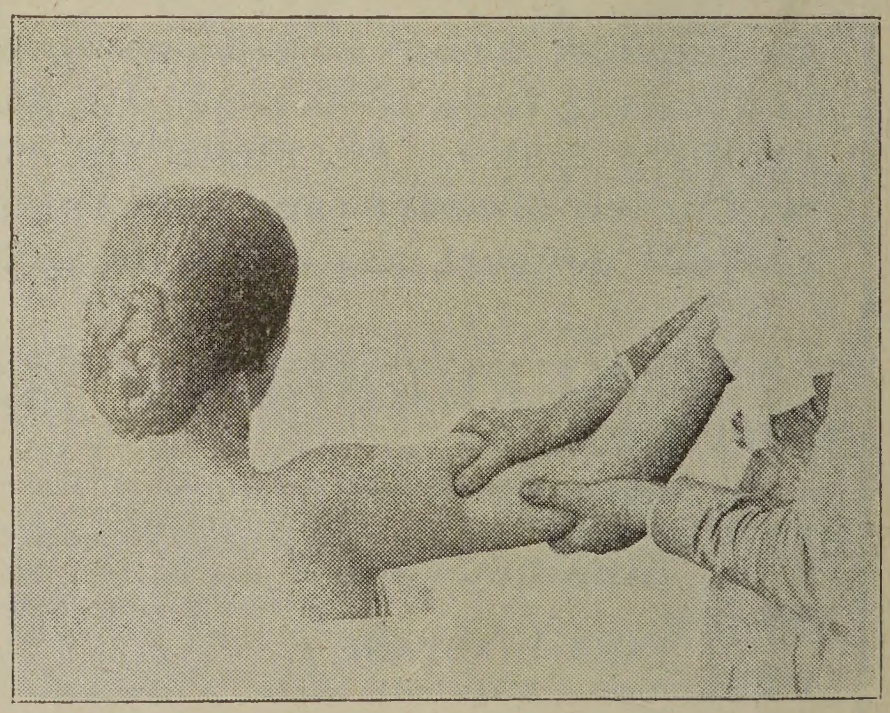
The Art of Massage

Its Physiological Effects and Therapeutic Applications.

BY J. H. KELLOGG, M. D.



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BACTERIOLOGICAL REVIEW.

VOL. V. BATTLE CREEK, MICH, U. S. A, MARCH, 1896. NO. 3.

ORIGINAL ARTICLES.

A NEW ATAXIAGRAPH.

BY W. H. RILEY, M. D.,

Sanitarium, Battle Creek, Mich.

Member of the American Neurological Association, etc.

ABOUT four years ago it occurred to the writer that in the study and examination of certain diseases of the nervous system, such as locomotor ataxia, multiple neuritis, etc., some means by which the amount of inco-ordination of movements, or the extent of ataxia in standing and in walking, could be accurately measured, would be a valuable help. Accordingly, such an apparatus was made for measuring the movements of static ataxia, or the irregular swaying movements of the body which are present in certain diseases of the nervous system when the patient attempts to stand still with the feet together in one position.

This instrument has been improved from time to time until about a year ago, when the apparatus as shown in Fig. A was perfected, and has proved to be very useful and satisfactory in the examination of nervous diseases. The instrument may be briefly described as follows:—

All the parts of the instrument except the wooden disk are made of metal,—iron and steel.

1 is an iron rod three fourths of an inch in diameter, four feet in length up to the elbow above; from the elbow, it extends out six or eight inches horizontally. This iron rod passes through the sockets 11 and 11′. The sockets being fastened to the wall or some solid support by screws, the rod may be moved up or down through the sockets, and fastened at any desired point by means of the thumb-nuts 4 and 4′. By this means disk 2 may be adjusted to the height of any individual.

5 is a steel spring which supports the disk.

6, 7, 8, and 9 are movable joints. The steel spring 5 and the four movable joints allow the disk to move up and down with the slightest pressure, which may be produced by the swaying movements of the body of the patient.

3 is a rope which passes through the pulleys, and to which a weight is attached, as shown in the cut.

The disk 2 is eighteen inches in diameter, and is slightly concave on the lower side.

10 is a framework made of heavy leather, which is placed on the head of the patient as shown in the figure. At the top and center of this framework is placed a soft lead-pencil for tracing the movements of the body. The pencil, which is attached to the framework on the head, marks on a piece of white cardboard, which is fastened to the wooden disk by means of thumb-tacks. This cardboard is marked with concentric circles, the circumferences of which are one centimeter apart. The purpose of these circles is to measure the distance that the patient's body moves from the center.

In using the apparatus, a plumb-line should be dropped from the center of the disk to the floor, and the point where the line strikes the floor should be marked. The frame supporting the pencil should be placed on the patient's head, he taking a position directly under the center of the disk, and standing so that the pencil in the frame will be in the center of the disk, with his feet placed so that the mark on the floor will be between the middle of his feet.

By this arrangement the tracing made

by the movements of the body when the patient is attempting to stand still with the feet together is marked by the pencil on the cardboard, which is fastened to the disk above the head of the patient. A tracing can be made thus with the eyes open or closed, as may be desired, and comparisons made of these.

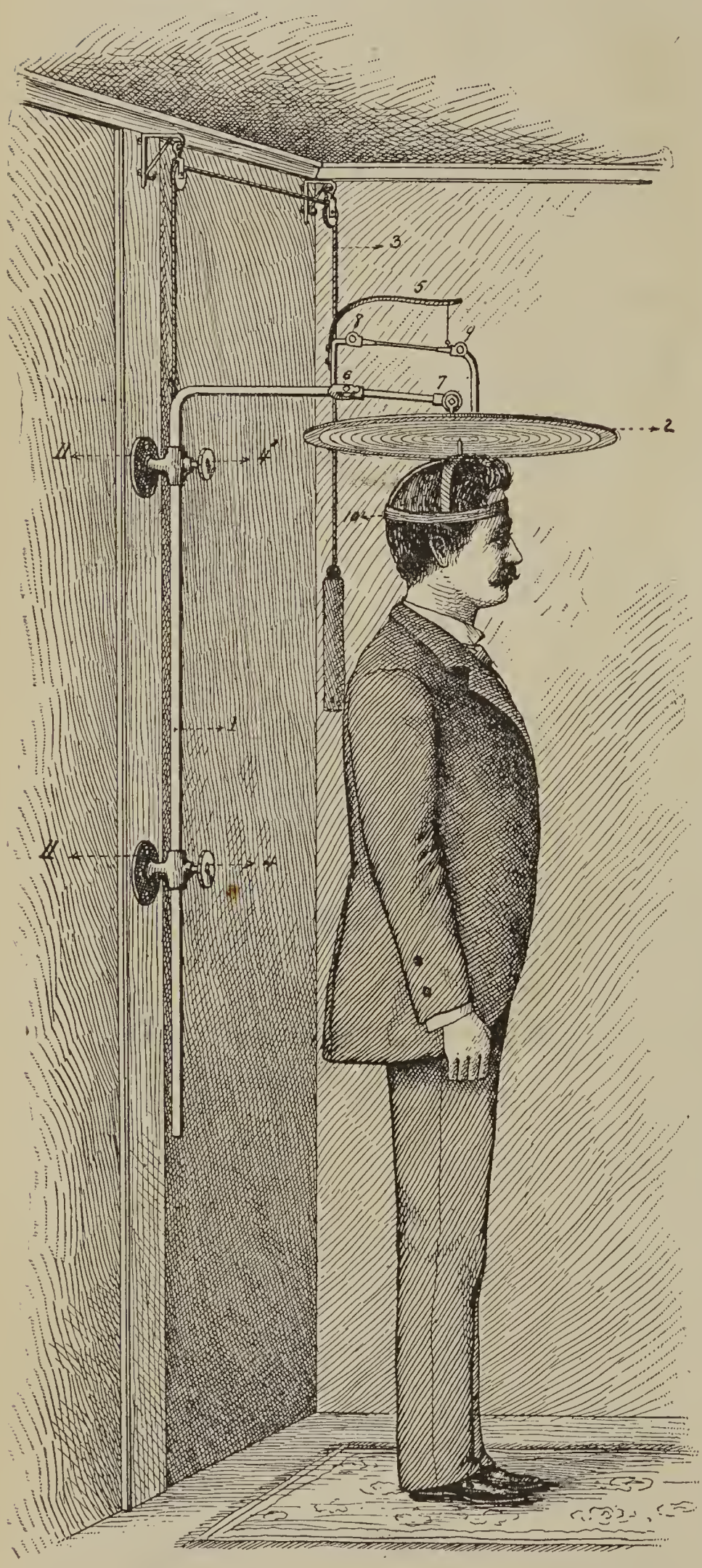

FIG. A. The author's ataxiagraph, showing position of patient when the ataxiagraph is in use.

Fig. 1 represents the tracing made by the movements of the body of a healthy individual when attempting to stand still with the feet close together and the eyes open.

Fig. 2 represents the tracing of the movements made by the body of the same individual attempting to stand still with the feet together and the eyes closed.

Tests were made with this apparatus on sixty adult individuals in good health, with the idea of determining, if possible, the extent of the movements of the body when the individual is attempting to stand still with the feet close together, and with the eyes open in one case, and with them closed in the other. It was found from these tests that the extent of the movements of the body under the conditions above referred to varied with different individuals, and that the swaying of the body was seldom as great as in the very early and incipient stages of diseases in which inco-ordination of movements is a symptom; and that in nearly every instance it was increased by the closing of the eyes. To illustrate, an individual whose movements would extend two centimeters from the center with the eyes open, would extend to the distance of four centimeters or more from the center when the eyes were closed. These swaying movements of the body which are present in healthy individuals in attempting to stand still with the feet close together are decidedly increased in certain diseases, notably in locomotor ataxia, multiple neuritis, cerebellar disease, neurasthenia, etc.; and these abnormal movements of the body are intensified in these diseases when the guidance of vision is withdrawn by closing the eyes, so that this test, which is quite delicate, is valuable in the examination of patients suffering with the above and other diseases, and is a material aid in forming a diagnosis.

The crooked line starting from the center in Fig. 3 represents the extent of the movements of the body in a case of neurasthenia when the patient attempts to stand still with the feet together and the eyes open.

The crooked line starting from the center in Fig. 4 represents the movements of the body of the same case, that is, neurasthenia, when the patient attempts to stand still with the feet together and the eyes closed.

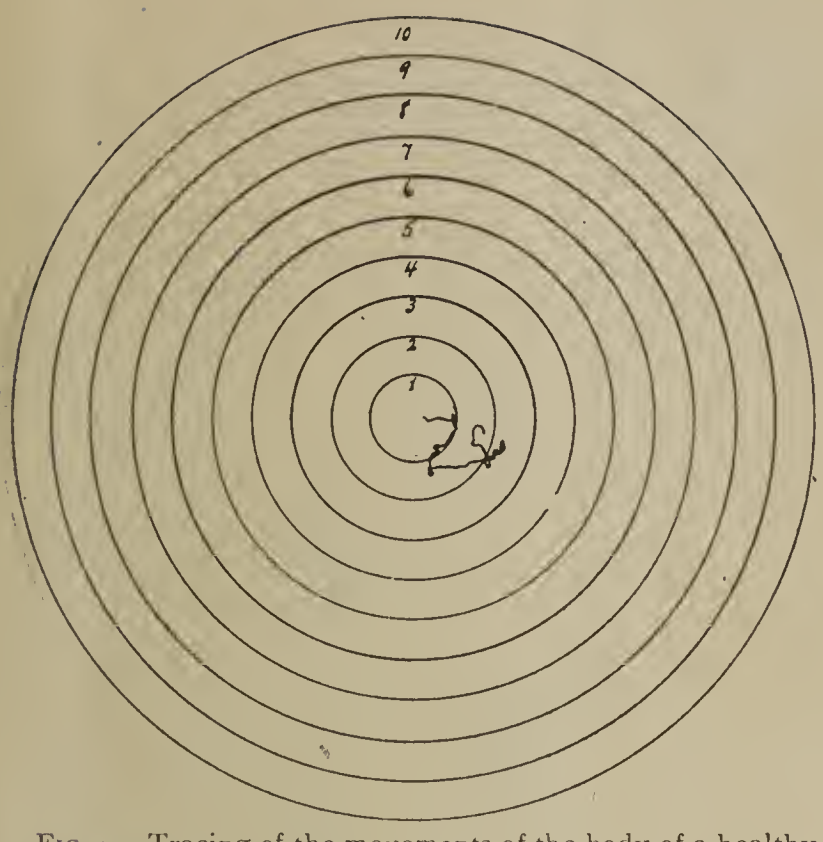

FIG. 1. Tracing of the movements of the body of a healthy subject when attempting to stand with the body in one position, feet together and eyes open.

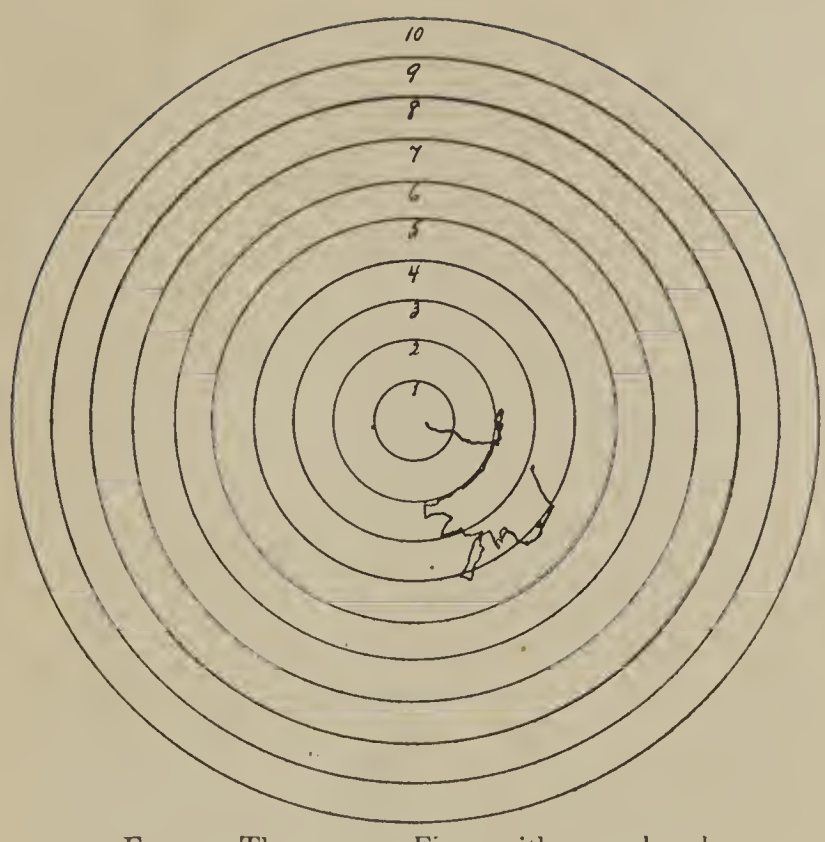

FIG. 2. The same as Fig. 1 with eyes closed.

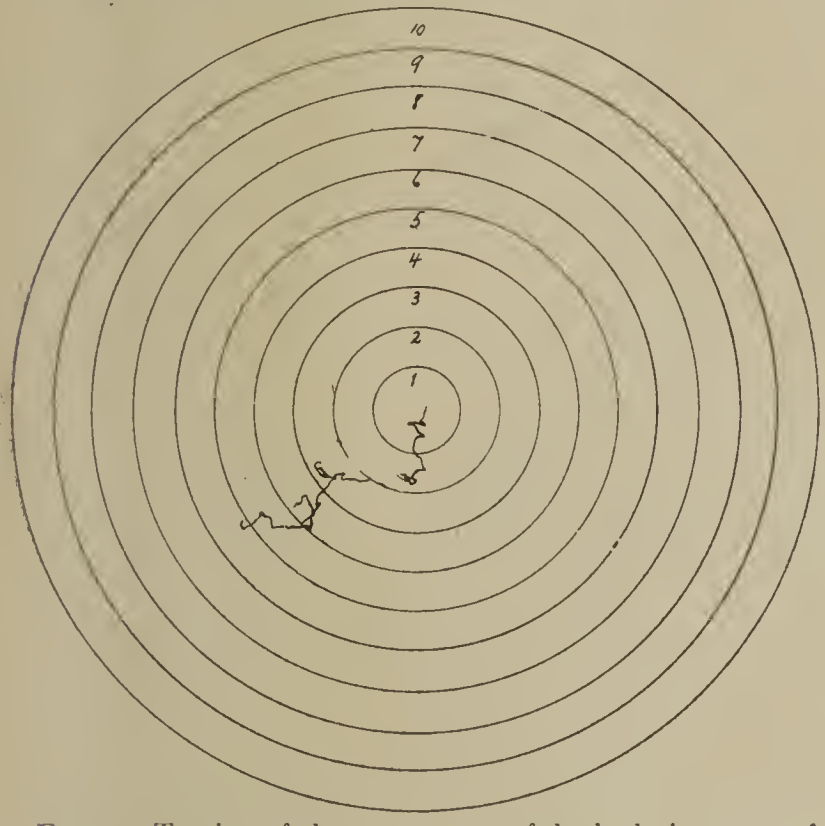

FIG. 3. Tracing of the movements of the body in a case of neurasthenia when attempting to stand with feet together and eyes open.

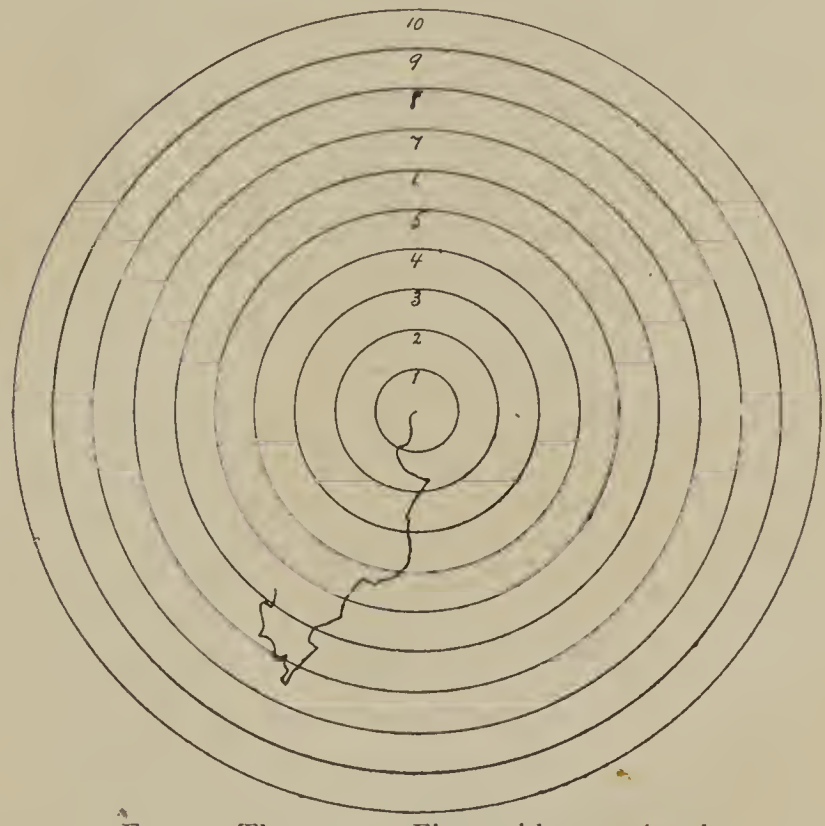

FIG. 4. The same as Fig. 3 with eyes closed.

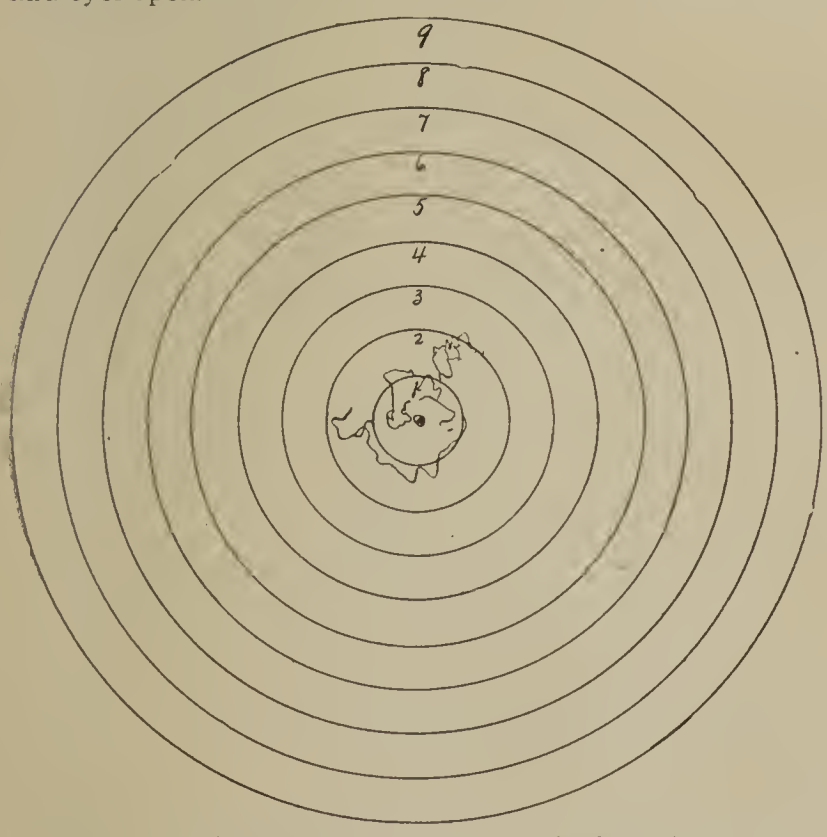

FIG. 5. Tracing of the movements of the body in a case of incipient locomotor ataxia. Patient standing with feet together and eyes open.

FIG. 6. The same as Fig. 5 with eyes closed.

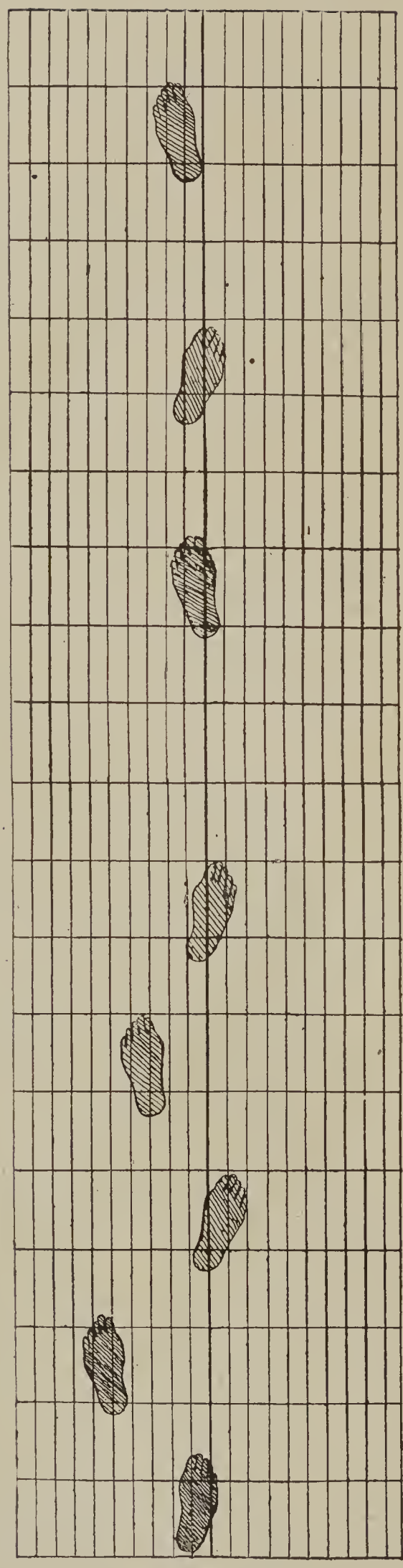

FIG. B. Diagram showing relative position in which the feet are placed in a case of incipient locomotor ataxia when attempting to walk on the heavy line in the middle of the plat with the eyes open.

FIG. C. The same as represented by Fig. B except that the patient's eyes are closed.

Fig. 5 is a tracing of the movements of the body with the feet together and eyes open in very early stages of locomotor ataxia.

Fig. 6 represents a tracing of the movements of the body of the same patient in the early stages of locomotor ataxia, with the eyes closed.

By comparing the movements of the body with the eyes open, with those made with the eyes closed, in each of the three cases referred to above, it will be seen that the swaying of the body is greatly increased by closing the eyes in a healthy person, as in the two diseases referred to.

The zigzag lines starting from the center of the concentric circles represent the tracing-line in each case.

Figs. B and C represent an arrangement for determining the amount of ataxia in locomotion. This arrangement can be made by marking parallel white lines lengthwise, five centimeters apart, on a piece of black cotton cloth. In the center there should be a heavy or double line, and on each side of the double line any number of parallel lines desired may be drawn. As shown in the illustration, Fig. B, there are ten parallel lines, five centimeters apart, on each side of the double line in the center, which is usually sufficient for ordinary purposes. At right angles to these lines just mentioned, which run lengthwise on the cloth, other lines are drawn crosswise on the cloth, twenty centimeters apart; the number of lines necessary, of course, will depend upon the length of the plat. Fig. B represents a plat which is four meters in length, a length quite sufficient for practical purposes.

In using this arrangement the patient first attempts to walk on the heavy double line in the center with his eyes open. Another test is made in which he attempts to walk on the heavy double line in the center with his eyes closed. These can be compared one with the other.

Fig. B illustrates the movements of the limbs and the position of the feet in a case in the very early stage of locomotor ataxia, the patient attempting to walk on the heavy line with his eyes open.

Fig. C illustrates the movements of the limbs and the position in which the feet are placed in attempting to walk on the double line in the center with the eyes closed. This is the same case as Fig. B in a very incipient stage of locomotor ataxia. The bottom of the patient's feet are covered with starch before beginning to walk on the double line in the center of the plat. (Anything that will leave a mark will answer the same purpose.) By this means the position of the feet can be readily determined, as the starch leaves a mark on the cloth where the feet were placed. A similar arrangement might be made by marking lines on the floor or on heavy manila paper.

This arrangement for measuring the inco-ordination in the movements of the legs and body in locomotion is valuable in the examination of cases in the very early stage of locomotor ataxia, and in neurasthenia, multiple neuritis, and diseases of the cerebellum; in fact, in any case where the physician is desirous of measuring accurately the amount of inco-ordination of the movements of locomotion. Examinations can be made from time to time by this arrangement. A reduced form of the plat, with the marking showing the position of the feet, can be preserved with the records of the case; the size as shown in Fig. B being a convenient size for the purpose of keeping on file or record. By this arrangement, comparisons can be made from time to time, showing whether the inco-ordination of the movements is increasing or decreasing. In a chart of this kind one always has before him a record of the amount of inco-ordination of the movements of the limbs, which is more expressive and more accurate than could possibly be given in words, as the marking of the position of the feet on the chart tells at a glance the extent of the inco-ordination of the movements.

WHAT IS THE MATTER WITH THE AMERICAN STOMACH?[1]

NEW AND EXACT METHODS OF FINDING OUT.

BY J. H. KELLOGG, M. D.,
Battle Creek, Mich.

(Continued.)

THE INFLUENCE OF MOIST AND DRY FOOD UPON SALIVARY SECRETION.

A SERIES of experiments made to determine the influence of moist and dry

[1] Presented at the Annual Meeting of the Mississippi Valley Medical Association, held at Detroit, Mich., Sept. 4–6, 1895.

food, natural food-flavors, and condiments or unnatural food-flavors upon salivary digestion, developed very striking and unexpected results, which I quote from another paper in which the outcome of these researches is presented in greater detail: —

The quantity of food or fluid was, in each case, thirty grams. The food, whether solid or fluid, was taken into the mouth in small portions and chewed for a few seconds, when, being rejected from the mouth, it was received into a small vessel for weighing. The length of the experiment with each substance lasted exactly five minutes. The difference in weight between the substance after chewing and before, represented the amount of saliva which had been added to it during mastication. I may add that the solid food used was granose, a dry and well-cooked preparation of wheat in thin flakes.

Thirty grams, or one ounce, of granose increased in weight 59.79 grams, or two ounces.

Thirty grams, or one ounce, of granose, with two grams of common salt, increased in weight 58.80 grams, or a little less than two ounces.

Thirty grams, or one ounce, of granose sprinkled with pepper increased in weight 59.1 grams, or not quite two ounces.

Thirty grams, or one ounce, of granose, with 5 c.c. of strong cider vinegar, increased in weight 55.9 grams, or about one and five-sixths ounces.

Thirty grams, or one ounce, of moist bread increased in weight 31.1 grams, or one ounce.

Thirty grams, or one ounce, of raw apple increased in weight 38.1 grams, or one and one-fourth ounces.

Thirty grams, or one ounce, of water increased in weight 2.92 grams, or one tenth of an ounce.

Thirty grams, or one ounce, of milk increased in weight 2.82 grams, or one eighth of an ounce.

Thirty grams, or one ounce, of pea soup increased in weight 5.82 grams, or one fifth of an ounce.

Paraffin chewed for five minutes produced 20 c. c. of saliva, or two thirds of an ounce.

The facts developed by the above-mentioned experiments furnish the foundation for most important therapeutic rules for the management of digestive disorders. It will be noted, on the one hand, that one ounce of dry granose chewed for five minutes so stimulated the activity of the salivary glands as to enable them to produce almost exactly two ounces of saliva, or three times the amount normally secreted by the young man who was made the subject of the experiment; on the other hand, the amount of saliva secreted when water was passed through the mouth amounted to a little less than 3 c. c. in five minutes, or about one seventh of the normal amount. With dry granose the amount of saliva secreted was *more than twenty times as great as with water.*

With moist bread the amount of saliva secreted was almost exactly half that with dry granose.

With milk the amount of saliva produced was only about one third more than that produced with pure water.

With pea soup the quantity was just twice as great as with water, but the amount was still only one tenth the amount produced with dry granose.

This fact places before us in the most graphic and emphatic manner the necessity for the use of dry food in cases of salivary indigestion. Instead of feeding our patients with malt, pancreatin, diastase, and predigested foods, we have only to require them to chew dry food; and in so doing they will develop in abundant quantity a starch-digesting ferment of greater value, because better adapted to the human stomach, than any possible artificial digestive agent which could be administered.

The use of "slops" is one of the most common dietetic errors among the American people. The American eats in a hurry, rinses down his food with copious draughts of tea, coffee, iced water, iced milk, or iced tea, and in consequence the salivary glands are not stimulated to proper activity, and so the amount of saliva produced is altogether inadequate to digest the starchy elements of food in the acid medium of the stomach contents, and the small amount produced is so diluted that its efficiency is greatly impaired. What wonder that starch indigestion is coming to be an almost universal complaint, as shown by acidity, eructations of gas, flatulence, and a great variety of stomach disturbances, to escape from which multitudes are continually swallowing quantities of magnesia, soda, neutralizing cordials, and alkaline min-

eral waters of various sorts, together with malt extracts and other digestants?

The inability to digest starch is doubtless one of the great causes of the inordinate consumption of beef and other animal products to which the average American has come to be addicted, not altogether in imitation of his English cousin, but as a method of escaping the pangs of starch indigestion.

The abundant provision made in the human body for the digestion of starch, —first, the saliva; second, the bile and pancreatic juice; third, the intestinal juice; and finally, the liver, —is evidence that nature intended man to subsist largely upon farinaceous foods. The arguments of the "natural food" advocates, who insist that man should live upon fruits and nuts, are based, not upon physiological facts, but upon the pathological experiences of the disciples of this doctrine. The writer having an opportunity, a year or two ago, to examine the stomach fluid of one of the most earnest and stalwart advocates of the fruit-and-nut diet, found the stomach greatly dilated, and almost completely inert.

I have cured many scores of chronic and very obstinate cases of dyspepsia by simply requiring the patient to subsist upon a dry diet, whereby he was compelled to thoroughly masticate his food. A favorite prescription with the writer, which is applicable to most cases of indigestion, is two or three ounces of dry granose at the beginning of each meal. This introduces into the stomach an abundant quantity of saliva,—probably from four to six ounces in most cases,—and insures efficient starch digestion in cases of both hypopepsia and hyperpepsia. It also serves to mitigate the acidity of hyperpepsia, and operates to prevent fermentation by the rapid solution and conversion of the farinaceous elements, thereby promoting their absorption. I am inclined also to the opinion that the maltose produced by the salivary secretion exercises in some way a controlling and beneficial influence on the processes of stomach digestion. The density of the stomach contents must have something to do with the chemical changes which occur during digestion. The presence of maltose in proper quantity may be the means of aiding glandular activity and absorption.

This is a subject which I am endeavoring to investigate, and upon which I hope to be able to throw some light by further experiments.

At a recent meeting of the American Medical Association, in a discussion which occurred upon a paper read by the writer, in which vinegar had been condemned on account of its powerful inhibitory influence upon salivary digestion, one of the speakers suggested that the stimulating effect of vinegar upon the salivary glands, thereby promoting the secretion of saliva, might more than counterbalance the inhibitory influence of this condiment, —in other words, the extra amount of saliva produced by the vinegar might more than balance the lessened activity of the secretion resulting from the presence of this acid. The same thought was expressed in reference to salt, pepper, and other condiments. I consequently subjected this matter to experiment, with the results already stated in this article. The amount of saliva secreted when salt, pepper, or vinegar was added to the granose, was in each case less than when the granose was taken by itself. In the case of vinegar the deficiency was much greater than with the other condiments.

We see from this that dryness is the property in food which stimulates the salivary glands to activity. A perfectly dry food excites the maximum amount of activity. The degree of stimulation produced by a dry food, such as granose, is indeed surprising, the amount of saliva secreted during the five minutes required for the mastication of the somewhat bulky granose (the young man masticated the food as rapidly as possible, ejecting it from the mouth as soon as it became well moistened) being twice the weight of the granose itself. The slightly lessened stimulating effect observed when pepper was added was probably accidental, as the figures agree as nearly as three experiments with granose alone would be likely to agree. However, the amount with vinegar is perceptibly less, showing that nature does not propose to waste energy in secreting saliva to be spoiled; in other words, a substance which destroys the activity of the fluids produced, is not capable, apparently, of promoting the activity of the salivary glands in the secretion of saliva. I do not undertake to lay this down as a general principle, but it seems to hold good in relation to vinegar at least. I have planned an exten-

sion of this experiment as a side-line of this interesting inquiry.

Another experiment of interest in the same connection was made for the purpose of determining the relative value of natural flavors; that is, such flavors as are found in natural and wholesome foods, in stimulating the secretion of saliva.

The mastication of an ounce of apple within five minutes produced 34 c.c. of saliva, 3 c.c. more than was produced in the mastication of moist bread. The proportion of water in the apple was certainly not less than that in the moist bread, nevertheless a larger amount of saliva was secreted, resulting doubtless from the stimulating effect of the natural flavors of the apple.

I have not space in this paper to go further into the practical deductions which may be drawn from these experiments. The subject is a comparatively new one, as almost no experimental work has been directed toward it, probably in consequence of the generally received assumption that the activity of the saliva upon the food ceases as soon as it enters the stomach. More recently developed physiological facts in relation to salivary digestion, which are very clearly stated by Freirichs, Ewald, Gamgee, and other excellent authorities, must lead to a revolution, not only in relation to our way of looking at stomach digestion, but also in relation to the therapeutics and dietetics of a large class of digestive disorders.

The extensive use of malt preparations of various kinds and the benefit recognized by many physicians, arising from the employment of diastatic ferments, substantiate the statement previously made in this paper that the inability to digest starch is one of the most common conditions existing among dyspeptics. In the examination of more than fifty-three hundred stomach fluids, I have found that the conversion of starch was complete in less than three hundred cases, and in quite a large number of cases there had been chemical evidence of little or no conversion. It is evidently, then, a matter of importance to know what substances, if any, interfere with starch digestion. The following is a brief resumé of the observations which I have made upon this point: —

EXPERIMENTS RELATING TO SUBSTANCES WHICH IMPEDE STARCH DIGESTION.

	Time.
Oxalic acid:	
1–10,000	No action.
1–15,000	35 minutes.
1–20,000	19 "
1–30,000	4 "
Lemon juice:	
1–200	No action.
1–500	42 minutes.
1–2,000	9 "
1–5,000	7 "
Orange juice:	
1–200	11 minutes.
1–500	4 "
Apple juice:	
1–50	45 minutes.
1–200	4 "
Vinegar:	
1–200	No action.
1–500	40 minutes.

Experiments were also made for the purpose of determining comparatively the influence of the same substances upon the action of malt diastase upon starch. The preparation of diastase used was a malt extract, one c.c. of which was capable of completely converting one-tenth gram of starch in two minutes. The following were the results: —

	Time.
Oxalic acid:	
1–2,000	No action.
1–5,000	5 minutes.
1–10,000	2 "
Lemon juice:	
1–10	No action.
1–200	2 minutes.
Apple juice:	
1–10	2 minutes.
Vinegar:	
1–10	10 minutes.
1–200	2 "
Hydrochloric acid:	
1–4,000	No action.
Lactic acid:	
1–200	No action.
1–2,000	5 minutes.

Several points of interest may be deduced from these experiments. A few may be briefly mentioned: —

1. Acids of all kinds inhibit the diastatic action of both saliva and malt, but human saliva is very much more susceptible to the inhibitory action of acids than is malt.

We find here an explanation for the observation previously made by patients,

that sour fruits disagree with them; but to test the matter further, I administered a number of experimental breakfasts in which vinegar and other acids were added to the stomach fluid. When one-half ounce of vinegar was added to the meal, it was found that the coefficient of starch digestion was reduced to .64. With the juice of one lemon, the coefficient was reduced to .29.

These experiments show very clearly that vegetable acids as well as the acids of the gastric juice have a decidedly deterrent effect upon starch digestion, and hence that they must be withheld in cases in which the digestion of starch is performed imperfectly or with difficulty. It is also apparent from the observations previously made that it is in cases of hyperpepsia especially that acids must be withheld, since in hyperpepsia starch digestion is already more or less interfered with by an excessively acid gastric juice.

The observations of Roberts, as well as my own, show that tea and coffee inhibit the action of the saliva upon starch to a very remarkable extent. Brinton, Wolff, Debove, and Reymond all assert that caffein diminishes the activity of the peptic glands, which accounts for the deleterious effects of tea and coffee upon digestion.

Gerard has shown that chlorid of sodium, when taken in excessive quantities, interferes with gastric digestion by provoking a profuse secretion of mucus, whereby the gastric juice is neutralized and its action upon the food impeded.

PEPTOGENS VERSUS DIGESTIVE FERMENTS.

With reference to substances supposed to aid digestion, it is surprising that so small an amount of attention has been given experimentally to the influence of pepsin upon digestion, when the enormous quantities of this and other digestive agents used are taken into consideration.

Some years ago Mosso, by experiments upon a dog, determined that the stomach of a dog of ordinary size was able to furnish pepsin enough to digest seventy kilograms, or 165 pounds, of albumen. This fact was ascertained by passing through the dog's stomach 2000 litres of water, acidulating the same with hydrochloric acid, and determining its degree of digestive activity.

More recently, Georges has demonstrated that the use of pepsin is absolutely valueless in cases of insufficiency of the gastric glands. The wines of pepsin, papain, and pancreatin, either with or without hydrochloric acid, are, according to Debove and Reymond, valueless to supply a deficiency of pepsin formed by the glands in the stomach. My own observations agree exactly with those of the authorities mentioned, in this respect.

After having employed pepsin for many years, on the strength of authority, I have now abandoned its use altogether, along with other digestive ferments, with the exception of malt, having been utterly unable to see any good results whatever from their use. What the stomach requires in cases of inactivity of the gastric glands, is, not a substitute for the normal product of these glands, but an increase of the activity of the glands. Peptogens are needed rather than peptones, peptonoids, or pepsins. Proteid substances are the best of all peptogens. The natural flavors of foods and the dextrin developed by the action of the saliva upon starch are also peptogens of the highest value. The fact last mentioned furnishes another plea for the use of dry foods by dyspeptics, thus securing thorough mastication.

In an experiment which I made to determine this point, it was found that the quantity of hydrochloric acid present in the stomach fluid after a well-masticated meal, consisting of water biscuit and water, was nearly double (or an increase from .028 to .05 milligrams per 100 c.c. of stomach fluid) that obtained after a test meal which was not masticated, from which it appears that thorough mastication encourages the production of HCl, as well as pepsin.

One of the very best of all peptogens is gluten. Eggs and milk are also peptogenic substances of value, particularly eggs. The peptogenic power of gluten is well shown in the following cases:—

After an ordinary test meal the amount of free HCl was found to be .046 per 100 c. c. of stomach fluid; the amount of combined chlorin, .232. In a test meal consisting of one ounce of water crackers

eaten dry, and one ounce of gluten mixed with water and swallowed directly afterward, the amount of HCl was found to be .064 per 100 c. c., and combined chlorin, .284, or an increase of forty per cent. In another instance the amount of free HCl was increased from .036 to .130, or 266 per cent., and the total acidity was increased from .260 to .354.

In a second meal, consisting of one ounce of pure gluten well chewed, dry, and eight ounces of water swallowed afterward, the total acidity was increased from .260 to .398, the combined chlorin from .216 to .294, and the free HCl from .036 to .046. No better evidence of the peptogenic properties of gluten could be asked for.

The popular idea that pepper, mustard, and similar substances increase digestive vigor has been shown by experiments to be erroneous. These substances, like common salt in excess, increase the flow of mucus without increasing the production of pepsin or hydrochloric acid. The production of pepsin and hydrochloric acid can be increased only by natural stimuli; that is, the peptogenic substances which nature puts into our food. These consist: (1) Of proteid substances which are intended to be digested by the action of pepsin and hydrochloric acid; (2) Of dextrin, the substance which naturally precedes peptone in the order of production in the digestive process; and, (3) Of food-flavors which by their reflex action increase the activity of all the digestive glands, as a preparation for the digestive act.

The secretion produced by mustard, pepper, pepper-sauce, and similar substances is for protective purposes only, the stomach pouring out a quantity of mucus which is spread over the mucous surface to protect it from the action of these abnormal and irritating substances. Alcohol, which has been supposed to be so beneficial to digestion, my experiments show to be equally destructive and injurious. This is well shown by the following experiments: —

The subject was a young man aged nineteen years. The analysis of stomach fluid, with the usual test breakfast and without brandy, gave the figures shown in the following comparative table, which relate to the number of milligrams of chlorin expressed in HCl found in 100 c.c. of filtered stomach liquid: —

	Usual Test Breakfast.	Usual Test Breakfast with 4 oz. of Claret.	Usual Test Breakfast with 2 oz. of Brandy.
	grms.	grms.	grms.
Total acidity.....	.240	.086	.016
Total chlorin.....	.328	.216	.306
Free HCl.....	.032	.000	.000
Combined chlorin.	.268	.120	.034
Fixed chlorin.....	.098	.116	.172
Coefficient	.77	.72	.47

Peptones and propeptones were found to be notably diminished in proportion to the syntonin in the stomach fluid containing brandy.

These experiments were repeated upon different persons, and with alcohol in different forms, as gin, brandy, wine, etc., the quantities being made such that the same amount of alcohol, about one ounce, should be taken in each case; and the results were found to be practically uniform, and essentially the same as have been given above. The accompanying comparative table shows very clearly the great diminution in the chemical activity of the stomach produced by alcohol. By a careful study of the table, it will be noticed that the young man who was the subject of the experiment had a more than normally active digestion. There is no excess of free hydrochloric acid, but an unusually large amount of combined chlorin, indicating what might be considered a physiological hyperpepsia, since the quality of the work done was but slightly below the normal standard, as shown by the value of the coefficient a. Four ounces of claret caused the complete disappearance of the free HCl, diminished the combined chlorin more than fifty per cent., and also diminished the quality of the digestive work done. The test made with the two ounces of brandy shows almost a complete paralyzing of the stomach, or apepsia. The free HCl disappeared entirely; and the combined chlorin, representing the useful stomach work, was reduced to .034, or one eighth the amount done under normal conditions. This influence upon the digestion is exactly what would be expected of a drug like alcohol, which is a paralyzer of protoplasmic activity, an anesthetic, and a sedative, not a stimulant, as has been erroneously supposed. It should be added that each preparation of alcohol was diluted with water, so as to make exactly eight ounces of fluid in each case.

(To be concluded.)

FORMALIN AS A HARDENING AGENT FOR NERVE TISSUES.*

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FORMOL, formalin, or formaldehyde, was discovered by A. W. Hoffman in 1863 while passing wood spirit and air over a red-hot platinum spiral. If the vapor is brought into water to its point of saturation, a forty per cent. solution of formaldehyde is obtained, which has long been known under the name of formol. The knowledge that formalin possesses antiseptic as well as hardening powers we owe to the researches of Dr. F. Blum, and these facts induced the elder Blum to make an extended series of investigations in the hardening of animal and vegetable tissues in the Senckenbergischen Institute at Frankfort, Germany. His preliminary report was published in the *Zoölogischer Anzeiger*, 1893, No. 434, and a more detailed report in the *Berichte über die Senckenbergische Naturforscher Gesellschaft*, 1894, p. 195. Here he details his experience, which, in brief, is as follows: Several human embryos were finely preserved in formol diluted with ten to twenty parts of water. Small embryos with amnion intact were preserved, and the amniotic fluid remained transparent, so that the structural parts of the fetus and the umbilical cord were recognizable. The mouse, hamster, and porpoise were nicely preserved, the hair firmly in place, and the eyes in better condition than under the use of alcohol. Reptiles, fishes, and amphibians were nicely hardened in one to ten, one to twenty, or one to thirty solutions, according to the size of the object. The fishes retained in great part their color, while the slime and mucus covering them was rendered transparent. Of the invertebrates, snails, jelly fishes, insects, spiders, etc., all were well preserved.

Of the various animal tissues, the muscles and the brain were quickly hardened, retaining the coloring matter of the blood in the muscles, while in the brain the differentiation between the white and gray matter was very evident. Fruits, flowers, and vegetables of various kinds were preserved with equal success, the coloring matter being very little, if at all impaired. Blum's conclusions regarding the hardening of animal tissues may be summed up as follows: —

Animal objects are hardened without shrinking, and without losing their microscopic structure or staining properties.

The natural form and color are preserved.

The eye remains much clearer than in alcohol.

The mucus of slime-producing animals is not coagulated, and remains transparent.

The coloring matter of blood in tissues apparently disappears, but may be quickly restored by a high per cent. alcohol.

These experiments of Blum were path-making, and were quickly followed by those of Born[1], Pintner[2], Krückmann[3], Kenyon, Sadebeck, Mayers[4], and others with seemingly favorable results as regards the preserving and hardening powers of this compound. Besides these qualities, it is especially valuable because of its being non-poisonous, non-combustible, of a low freezing point, and (what to scientists is quite a serious question) very cheap.

My attention was directed to this substance about one year ago, through experiments made at the laboratory of the Erie County Hospital by my interne, Dr. Helvie.

Various tissues, as of the liver, spleen, placenta, lungs, heart, muscles, and other organs, were satisfactorily hardened and preserved. Especially gratifying were the results obtained with the umbilical cord and other myxomatous tissues. Instead of shriveling up and becoming opaque, as is the case when alcohol is employed, the cord retained its normal size, and was transparent and hardened to such a degree that sections were easily and perfectly cut with the microtome. The intestines were greatly shriveled during hardening, but otherwise were a success.

These results induced me to try its virtues upon the brain and spinal cord, and especially to find the earliest time

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*Read at the eighteenth annual meeting of the American Microscopical Society, Cornell University, Ithaca, N. Y., Aug. 22, 1895.

1Med. Sect. d. Schlesisch, *Gesellsch. f. Vaterl Kultur.*, 1894.
2*Ver. Zool. Gesell.*, Wien, 1894, p. 8..
3*Centralbl. f. Bakteriol und Parasitenk.*, 1894, pp. 851-57.
4*American Naturalist*, Jan. 1, 1894.

when a spinal cord so hardened could be imbedded in celloidin and sections cut for staining and mounting. A spinal cord which to all appearance was normal, was cut in pieces about one centimeter long, and sections of the cervical, thoracic, and lumbar regions placed in bottles containing a five per cent., ten per cent., twenty per cent., and twenty-five per cent. solution of formalin. At the end of seven days a section of the cord was taken from each of these solutions and imbedded in celloidin, then placed on the microtome. The cord was evidently too imperfectly hardened, as no good cuts were obtained.

At the end of fourteen days the same procedure was followed, likewise on the twenty-first and the twenty-eighth days. At each of these intervals excellent cut were obtained; the cord retained its external contour and appearance, but the differentiation between the white and the gray matter was not as well marked as when alcohol is used. These sections took the carmine stains nicely, but less so the nigrosin, Pal, and Weigert stains.

The most serious action of the formalin on all of these sections was a contraction, evidently of the neuroglia in various regions of the cord, especially of the white matter, resulting in the formation of open spaces, or cavities. In the sections hardened in the ten per cent. solution, these cavities were so large as to destroy completely the slides for microscopical purposes. In the fifteen per cent. cord, the cavities were much smaller, but far more numerous, and the dorsal white columns looked like a honeycomb or sieve. This action of the formalin was manifested in every section examined, and is therefore not of accidental, but of regular, occurrence.

The drawback of the formalin in preventing the employment of the Pal and Weigert methods of staining has been successfully overcome by Marcus,[1] who, after hardening the cord from two to four weeks in a one-half per cent. solution of formalin, places small portions one-half centimeter thick in Müller's fluid in a brood oven for seven days at a temperature of 37° C. They are then dehydrated, imbedded, and the cuts again placed in Müller's fluid, from two to seven days in a brood oven, quickly washed in alcohol, then transferred into the Weigert stain.

1 *Neurologisches Centralblatt*, Jan. 1, 1895.

The action of the formalin on the ganglion cells is a happy one, swelling them, and rendering their nuclei susceptible to very intense staining.

The action of formalin on the brain has given very fine results. Born succeeded in hardening the entire brain very quickly for demonstrations, also small particles for microscopical purposes. I have been equally successful, and have some excellent specimens, nicely hardened. I have not as yet tried any of the staining methods on brains thus hardened, and cannot state what the results would be, although I have some specimens under way. From my experience with formalin, I can highly recommend it for the hardening of the various organs and tissues for macroscopic as well as microscopic purposes, but would still cling to the Müller solution for hardening the spinal cord, even if the time required for hardening be much longer than when formalin is used.

ON THE FLAGELLA OF MOTILE BACTERIA.*

BY VERANUS A. MCORE,

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DURING the past three years several new methods for demonstrating flagella have been announced. Up to the present time, however, a perfectly satisfactory process has not been devised; and the results obtained by different workers have been in many instances quite contradictory. The efforts to fix upon the flagella specific characters have also failed, although much advance has been made in that direction.

Notwithstanding the somewhat definite results which have been obtained in reference to the structure of the flagella, it appears to be of the highest importance that their nature should be more fully determined before they are accepted as constant and integral parts in the morphology of individual bacteria. The examination of a large number of preparations stained by the same method, and frequently a single specimen, will reveal quite different appearances. In some instances, and in my experience on a large majority

* Abstract of a paper read at the eighteenth annual meeting of the American Microscopical Society, Ithaca, N. Y., Aug. 22, 1895.

of the bacilli, the flagella appear as appendages radiating from the body (nucleus according to Bütschli) of the organism. I have occasionally observed a narrow unstained or more feebly tinted band separating the body of the organism from a deeply stained ring of which the flagella appeared to be projections. This capsule-like appearance has been illustrated by several observers. Bütschli, Zettnow, and others hold that the part of the bacillus which is easily brought out by the ordinary staining methods is the nucleus only, and that the additional portion of the organism demonstrated by Löffler's method is plasma, which surrounds the nucleus. Haeckle, on the other hand, states that they have no nuclei. For this and other reasons he refers bacteria to the animal kingdom, placing them in the first class of Achezoa.

Farrier has recently published a series of interesting experiences in which he shows that flagella on a single species of bacteria — as determined by the study of several forms — are subject to variations according to the conditions under which the organism is cultivated. Thus he found that the bacillus coli communis, cultivated at the temperature of the body, possessed several flagella, but when grown at a much higher temperature (46° C. maximum temperature for this bacillus), flagella could not be detected. If grown at 44° C., a few of the individual bacteria possessed these appendages. The age of the culture and the presence of a non-fatal quantity of an antiseptic in the culture media were likewise found to have appreciable effects. He states that this pleomorphism is due to their protoplasmic nature; the hypothesis assumed being that when the bacteria are subjected to degenerative agencies, such as high temperatures or antiseptics, the plasma contracts in a ball-shaped mass (presumably about the organism); but under favorable conditions, the plasma resumes its motile form.

Accepting this explanation, it is difficult to understand why the motile bacteria possessed of capsules such as micrococcus lanceolatus are not, under certain conditions, motile, or why the methods employed satisfactorily in staining the capsule will not act as well in bringing out the flagella. I have tried repeatedly to stain the flagella after these methods, more particularly the one used by Professor Welch in staining the capsule on micrococcus lanceolatus, but invariably the results have been negative. Why there should be such a marked difference between the motile and non-motile forms in the reaction of the "capsular" plasma to staining fluid, has not yet been explained.

I have sought for an explanation of the structure of the flagella-producing substance in the cilia or flagella of the zoöspores found in certain of the fungi, but thus far my efforts have not been rewarded, although much assistance may be obtained from a study of those forms. It is quite probable that certain phenomena, especially in reference to the free flagella and rings and hooks, may be explained by the same theories as those of zoöspores.

There are two views as to the disposition of the flagella of swarm spores. One is, that they are cast off, and the other, that they are absorbed into the body of the spore. Rothert shows, in a recent article, that both views are correct. "In the second swarm stage of saprolegnia and in the peronosporeæ, the flagella are either cast off as soon as the spores come to rest, or soon after, or else they remain attached to the spore indefinitely, even after germination. In the first swarm stage of saprolegnia, however, he found, to his surprise, that they are uniformly drawn back into the body of the protoplasm, the withdrawal being slow at first, and then quite rapid. The loops are formed either while the flagella are attached to the spores, or after they are cast off." He suggests that the flagella are formed of special cytoplasm existing only in small quantities. There is a close resemblance between the flagella of bacteria and those of the swarm spores.

The observations of Stoklin and Bunge, that several bacilli are sometimes included within the same capsule from the periphery of which flagella radiate, is exceedingly interesting. This phenomenon is explained in two ways: one is, that the surrounding plasma of two or more bacilli runs together, thus enclosing the bacilli in a common capsule; and the other is that the variable number of bacilli included within the same capsule is due to the multiplication of the organisms within the capsule. These observations strengthen the hypothesis that bacteria have nuclei and surrounding plasma.

TRANSLATIONS AND ABSTRACTS

[THE articles in this department are prepared expressly for this journal.]

HOT WATER IN SURGERY.

AT the last Surgical Congress, M. Reclus (*La Presse Medicale*) stated that he never amputates a crushed limb, no matter how great may be the extent of the injury. He envelops the limb with antiseptic gauze, and allows nature to separate the living from the dead tissues. But this method is possible only by the aid of hot water, which may be employed in the following manner: —

After disinfection of the injured part, the patient, who is nearly always in a state of traumatic shock, is surrounded by hot blankets, and the wound is laved with hot water at 60° to 62° C. (140° to 144° F.) An irrigator is employed, the vessel containing the water being at such an elevation as to produce a strong jet. A jet of hot water should fall upon every portion of the injured surface. It is only by this means that all clots, micro-organisms, and foreign particles can be removed. The hot water has a triple advantage: —

1. The high temperature is truly antiseptic.

2. It is hemostatic, and under its influence the hemorrhage is arrested.

3. It antagonizes the traumatic shock resulting from loss of blood.

Another indication for the employment of hot water in surgery is in cases of hemorrhoids in which a radical operation is declined. Whenever an acute attack occurs, there should be applied to the anal region compresses of tarlatan or cheese-cloth moistened in water at 55° C. (131° F.). The compress rapidly cools, and should be renewed every minute, being applied as quickly as possible after heating by dipping in hot water. The patient should take, every morning, an enema of hot water at the same temperature. If the hemorrhoids are of recent development, and small in size, with no marked contraction of the sphincter or varicose masses of appreciable size, the hot water will relieve these attacks to such a degree that the amelioration will amount to a cure.

Hot water, according to M. Reclus, is truly a sovereign remedy in the treatment of acute prostatitis. The technique is as simple as possible. An irrigating-tube is carefully and slowly introduced into the anus so as not to injure the swollen prostate which obstructs the rectum, and water is applied at a temperature of 55° to 60° C. (131° to 140° F.). The water should be admitted very slowly. This application should be made twice a day until a cure is effected. The relief is almost immediate, and nine cases are given by M. Reclus in which there has been no suppuration.

[I have made use of a special form of irrigator for application of hot water to the rectum for many years, which I find much more convenient than the ordinary rectal tube. It consists of a tube furnished with a bulbous extremity perforated with small openings through which the water passes into the rectum. This tube is placed inside a larger tube, or sleeve, through which the water escapes from the rectum. This irrigator is made of hard rubber. It is illustrated in the accompanying cut. — J. H. K.]

The same treatment also gives excellent results in prostatic congestion, and M. Reclus has seen a hot enema relieve the retention of urine which is brought on in patients suffering from enlarged prostate by the slightest excess of fatigue or exposure to cold.

In salpingo-ovaritis, M. Reclus proceeds as follows: "The uterine cavity is disinfected and thoroughly drained, and enemata of hot water are daily administered. The best time for the enema is in the morning half an hour after rising." M. Reclus has seen many cases of perimetro-salpingitis recover under this treatment.

Prostatic Hypertrophy in Castration.— Professor Englisch presented, at a recent meeting of the Imperio-Royal Medical Society of Vienna, the following interesting summary of our knowledge

upon this subject, and the relations of the testicles to the prostate: —

"That a relationship exists between the testes and the prostate is amply demonstrated by the parallel development of these organs. In cases of absence of the testicles, the prostate is also missing; and when only one testicle exists, the prostate is invariably less developed on the side where the defect is. In eunuchs the prostate is very much reduced in size. When the testicles are removed in young dogs, the development of the prostate is arrested, while the same operation performed on an adult animal results in atrophy of this organ.

"On these facts the treatment of prostatic hypertrophy by castration is based. To arrive at a correct estimate of the value of this operation, we must consider its influence both on the prostate and on the disturbances of the urinary apparatus. Of one hundred and two cases of castration, the effect on both was favorable in sixty-eight; in thirty-two cases there was no perceptible effect on the prostate, but considerable improvement of the urinary disturbances; in two cases the prostate decreased in size without any change in the urinary disturbances. Of the total number of cases, ninety-six were kept under observation for some time, and in thirty-seven of these, recovery was maintained, whereas in the other fifty-nine there was only ephemeral improvement. In no other method of treatment hitherto employed have the results been equally satisfactory. Spontaneous micturition was established in the majority of cases in a very short time."

Abdominal Section for Visceral Prolapse.— Treves reports in the *British Medical Journal* a case in which he performed abdominal section for the purpose of restoring the stomach and liver to their normal position, which he accomplished by suturing the liver to the abdominal wound. The result was a complete recovery, and the patient is now enjoying excellent health.

Rheumatism and Appendicitis.— Dr. Beverly Robinson, of New York, recently argued in the New York *Medical Record* that there is an intimate relation between acute rheumatism and appendicitis. He has frequently noted symptoms of rheumatism in persons who have had several attacks of appendicitis. This clinical observation of Dr. Robinson's entirely agrees with the researches of one of Pasteur's assistants published a year or two ago in the *Annals of the Pasteur Institute*, which show the close relation between intestinal catarrh and rheumatism. He demonstrated that catarrh in these cases is due to a specific microbe, which forms colonies on the mucous membrane in the intestine. That there is a close relation between appendicitis and intestinal catarrh was long ago very clearly established.

Cause of the Increase of Cancer.— Dr. W. Allan Jamieson, F. R. C. P., physician for diseases of the skin at the Edinburgh Royal Infirmary, in discussing the causes of these diseases, calls attention to the fact that the frequency of cancer has greatly increased within the last fifty years, an opinion with which Mr. Christopher Heath, an eminent English surgeon, also agrees. The author expresses the belief that the increase in the consumption of butcher's meat, and especially the extensive use of beef, are causes of this great prevalence of cancer in modern times. Dr. Burney Yeo is quoted as declaring that "among other evils attending an animal dietary, one is, that it favors the tendency, where it exists, to the development of cancer." The excessive use of meat is also considered to be a cause of eczema.

The Medicated Douche for Vaginal Catarrh.— According to M. Strausmann, there are two forms of vaginal catarrh: —

1. A variety which may be termed dry catarrh, or seborrhea of the vagina, chiefly observed in old or fleshy women, or during pregnancy, characterized by a profuse white discharge. This form of the disease rapidly disappears under the use of alkaline injections, as for example, two teaspoonfuls of soda to the quart of water. The alkali doubtless acts in neutralizing the unusual acidity of the vaginal secretions. Alum should never be employed in these cases; its use is decidedly contra-indicated, and is often harmful.

2. A simply muco-purulent catarrh of the vagina, chiefly observed in young women,

sometimes as the result of the irritation of ascarides. In this form of the disease excellent results may be obtained by the use of vinegar in the proportion of four teaspoonfuls to a quart of water. Sulphate of zinc, in the proportion of a dram to a quart, may also be employed with advantage.

In gonorrhea, the treatment must differ according to the location of the infection. Sometimes the urethra is the chief seat of the disease, in which case the patient should rest in bed. The parts should be bathed in a one per cent. solution of sulphate of zinc. In cases in which the neck of the womb has become infected, it should be carefully cleansed daily, and a vaginal tampon, moistened with a solution of corrosive sublimate, one part to one thousand, should be applied. The pledget should be held in place by another vaginal tampon saturated in glycerin containing three to five per cent. of iodoform. This method of treatment relieves the pain and itching.

The granular vaginitis which sometimes appears some weeks after infection, should be treated by weak antiseptic solutions. Solveol, one or two teaspoonfuls to a quart of water, is much less caustic and less toxic than phenic acid.

Creosote Enema.— Annequin, of the hospital at Grenoble, France, employs milk as a vehicle for creosote administered by the rectum, first adding creosote to milk in the proportion of one part to twenty, and then adding two hundred and fifty parts of boiling water. When shaken together, these constituents form a perfectly milk-white emulsion. Used in this way, creosote is the best of all medicinal agents that can be employed in the treatment of consumption.

Iodine Vaginal Douche.— M. Romme (*La Presse Medicale*) recommends, as the best of all medicated solutions for vaginal injection, tincture of iodine in the proportion of one teaspoonful to a quart of hot water. M. Romme is much opposed to the use of the ordinary antiseptics, because of the fact that they harden the epithelium, and thus increase the danger of absorption. This objection appears to apply to bichloride of mercury, permanganate of potash, and sulphate of copper, all of which substances, although excellent antiseptics, harden the epithelium to a marked degree.

New Application of Tendon Grafting.— An American surgeon, Milliken, has found a method of curing the deformity resulting from infantile paralysis, by attaching, by means of sutures, the tendon of a paralyzed muscle to the tendon of a muscle not affected by disease.

Maunsell's Method of Intestinal Anastomosis.— Dr. Wiggin, of New York, has done the profession a favor in describing Maunsell's method of intestinal anastomosis, which offers an advantage over all others, in that it is a ready method, requiring no special appliances. The most essential point in the method is the making of an incision a short distance above the divided end of one section of the intestine, through which the two ends are made to protrude, thus presenting themselves in the most convenient position possible for careful suturing, being afterward pulled back, and the slit closed. The *New York Medical Journal* for Dec. 14, 1895, contains an article describing the operation, which is illustrated by a number of very good cuts.

The Echinococcus in the United States.— This disease, which has heretofore been considered rare in this country, is due to infection of the body by the embryos of a species of tapeworm. In the case of this parasite, man stands in the same relation to some other animal as does the ox to man in the case of the common tapeworm. Dr. de Solis-Cohen, in a recently published note, calls attention to the fact that this disease is no longer so rare as formerly, but is increasing, a fact which is true of all other forms of parasitic disease due to the close association of man and domestic animals.

Objections to a Milk Diet in Typhoid Fever.— We are glad to note that so eminent an authority as Professor Da-Costa has called attention to the fact that an exclusive milk diet is a source of mischief rather than benefit in typhoid fever. The white of egg, dissolved in water, has

been recommended in the place of milk, which often produces disturbance by the formation of curds in the stomach. These do not digest, but undergo decay, and produce ptomains, which, being absorbed, increase the fever and also the coat upon the tongue, as well as tympanites and other bowel symptoms.

Chlorin for Pruritus Ani.— Dr Berger, a Russian physician, recommends the application of chlorid of lime in pruritus ani. A piece of cotton-wool is soaked in a strong solution of ordinary chlorid of lime and introduced into the anus. As soon as a slight burning or smarting is experienced, the cotton plug is removed, and the anal region, internal and external, washed with the solution, and afterward left to dry spontaneously. This method is said to remove the itching very quickly, after which the eczema and swelling soon disappear.

Treatment of Hydrocele by Injection of a Solution of Iodoform in Ether.— The method is very simple. The fluid is withdrawn by an ordinary exploring syringe. Leaving the needle in place, the syringe is filled with a ten per cent. solution of iodoform and ether. The syringe being connected with the needle again, this solution, to the amount of forty-five to one hundred and twenty minims, is injected in such a manner that it may come in contact with the whole of the sac. The injection should be made as quickly as possible, so that the ether will not become overheated. After coming in contact with the tissues, the ether boils, and diffuses the iodoform throughout the whole sac. There is but little pain, and the operation is very effective.

Hot-Air Baths in Dropsy and Anemia.— Dr. K. Dehio (*Medical Week*) recommends hot-air baths taken in bed as of great value in many diseases, particularly in dropsy and grave anemia. The bath is given by a very simple device by which sheets are supported over the patient while the bath is administered. In such a bath the temperature usually rises to 38.5° C. (100.4 F.), seldom to 39° C. (102° F.). The quantity of perspiration produced in a bath of two-hours' duration at a temperature of 45° to 50° C. (113° to 115° F.) may amount to one or two quarts. A hot-air bath also diminishes the amount of urea and uric acid eliminated by the kidneys.

The hot-air bath is especially useful in cases of dropsy from disease of the kidneys. It has a powerful diuretic as well as diaphoretic effect. The effects of the hot-air bath are usually unfavorable in dropsy occurring from disease of the heart, although sometimes useful even in these cases. The translator has found the electric-light bath much more effective for each of these purposes than the vapor or hot-air bath.

A Weak Solution of Nitrate of Silver for Hemorrhoids and Anal Fissure.— M. Schmey reports the cure of many cases by the daily application of a two per cent. solution of nitrate of silver. In one case, hemorrhoid nodules entirely disappeared after eight applications. A case of extreme anal fissure recovered in the same length of time under this method.

Compulsory Notification in Rheumatic Fever.—Dr. Newsholme, of Brighton, England, urges the importance of recognizing, not only tuberculosis, but also rheumatic fever, among the infective diseases in which notification should be compulsory. In Norway and Denmark this is done. On the returns from these two countries he bases the conclusion that rheumatic fever occurs in great epidemics, sometimes assuming pandemic proportions. The dry seasons, especially when there has been a succession of such seasons, producing a low ground water and an exceptionally high ground temperature, seem most favorable for such outbreaks.

Influence of Fatigue upon the Hearing.— A striking illustration of the influence of fatigue upon the nervous system is afforded by an experiment conducted by an Italian physician some months ago. Twenty-four bicycle riders who had ridden thirty-two miles in two hours and a quarter were examined with reference to their hearing, and it was in nearly every instance found to be defective. After two hours' rest, the hearing had become normal in most of them.

BACTERIOLOGICAL NOTES.

[THE notes appearing in this department are abstracts or translations prepared expressly for MODERN MEDICINE AND BACTERIOLOGICAL REVIEW, from original sources.]

Method of Demonstrating Protozoa and Spirilla in Drinking-Water.— The method is as follows: An ordinary brown bean is placed at the bottom of a test-tube, which is then filled nearly full with distilled water, and kept upright at the temperature of the room, as free from currents of air as possible. Water, with the oxygen it contains, is taken up by the bean, and certain soluble substances (including sugar and phosphates) diffuse from the latter into the water, serving as nutriment for the bacteria. In the first place, the organisms upon the surface of the bean develop, producing a cloudiness over its surface. This cloud of developing organisms soon rises, however, owing to the rapid removal of oxygen from the neighborhood of the bean. The level attained by the dense mass depends on the time which has elapsed since the experiment began, and upon the temperature. In the case now quoted, in forty-eight hours, at 20° C., the collection of organisms was seen at a point two to three cm. above the bean, as a thin, opaque layer (the "bacterial level"), which appeared as a sharp line when viewed from the side. Above and below this, the water was clear. The "level" is that point at which the oxygen from above and the nutrient stream from below meet, and afford suitable conditions of growth for the bacteria.

In place of the bean, sterilized nutrient agar, or gelatin, may be used. This, after setting, is inoculated with the material to be examined, and sterilized water is then poured over it. The water may be thickened with agar (one per cent.). The bacterial level forms as before, with certain distinctions. The special advantage of this method is that it realizes all possible conditions in respect of concentration of nutrient material and oxygen. Hence, it is very suitable for the study of protozoa and spirilla. Some of the water to be examined is poured into a tube, at the bottom of which is the solid gelatin, or agar. A "level" presently forms, containing various bacteria. The water above this is suitable for the development of protozoa, owing to a combination of the following conditions: A low proportion of organic material (which has been largely filtered off at the bacterial level), a high proportion of bacteria (which serve as food), and variations within wide limits of the same amount of contained oxygen. In samples of this water the protozoa can be well studied. Presently the surface of the water becomes covered with a thick layer of bacteria and monads, and the entry of oxygen is consequently much hindered. Spirilla now develop, forming a "level." Beyerinck gives the results of examination of a specimen of drinking-water by this method. He shows that the protozoa and spirilla therein contained existed in the water at the time of collection, and had not merely gained access to it from the air of the laboratory. In conclusion, certain modifications are pointed out by which the method may be adapted for wide application.— *American Medico-Surgical Bulletin.*

Destruction of Microbes in Sponges.— Sponges cannot be disinfected by heat, as they are damaged by a temperature of 60° to 80° C. (140° to 176° F.). The effect of heat is to reduce the size of the sponge, to diminish its elasticity, to reduce its absorbent power, and to otherwise injure it. It can only be rendered free from germs by means of antiseptic germicidal solutions; it should be immersed one or two weeks before being used. Carbolic acid, one part to twenty parts of water, is the most satisfactory antiseptic solution for this purpose.

Disappearance of Microbes from the Nose.— Thomson and Hewlett, of the British Institute of Preventive Medicine, have recently published an abstract of a paper detailing work done by them in the bacteriological department of the Institute, for the purpose of determining the fate of the micro-organisms of inspired air. The abstract is as follows:—

"In a communication we recently had the honor of reading before the Royal Medical and Chirurgical Society on 'Micro-organisms in the Healthy Nose,' we estimated that at least 1500 organisms are inspired every hour, while it must be a common event for this number to rise to

14,000. In spite, however of the enormous number of organisms inspired, numerous observers have shown that expired air is practically free from microbes (Tyndall, Gunning, Strauss). In the experiments of Strauss, of 609 microbes inhaled, only a single one was expired. Lister's observations on pneumothorax caused by a wound of the lung by a fractured rib seem to show that the organisms are arrested before they reach the air cells; while the experiments of Hildebrandt indicated that this arrest takes place before the trachea is reached, probably in the nasal cavities. This seems to be the case, for we have examined bacteriologically the tracheal mucus from many recently killed animals, and have always found it sterile. In our paper referred to above, we arrived at the conclusion that the mucous membrane of the normal nose seems to be usually quite free from micro-organisms, while the vestibules, vibrissæ, and crusts are swarming with them. If, then, the bacteria in inspired air are arrested in the nasal cavities, what becomes of them? and how are they gotten rid of? That the action of the ciliated epithelium is an important factor can hardly be doubted, for any particles deposited on a ciliated epithelial surface are rapidly moved onward, as can be demonstrated by watching the movement of a particle of wet cork placed on the dorsal wall of a frog's pharynx.

"The following experiment shows that bacteria deposited on the Schneiderian membrane are rapidly removed. Cultures were prepared from the vibrissæ and mucous lining of the nose of one of us, who acted as the subject. No red growth developed in these, so that the bacillus prodigiosus was absent. A looped needleful of a pure culture of the bacillus prodigiosus was then deposited on a spot on the septum naris, and cultures were made from this spot and its neighborhood at intervals up to two hours. Cultures made within five minutes gave an abundant confluent growth of bacillus prodigiosus; after fifteen minutes the amount of growth was distinctly decreased; after sixty minutes the growth was diminished by seventy-five per cent.; after eighty minutes practically no growth occurred; while after two hours no trace of the bacillus prodigiosus could ever be detected.

"Wurtz and Lermoyez have stated that the nasal mucus exerts a bactericidal action, but so far we have been unable to confirm their researches.

"We have made a number of experiments to test the bacterial condition of the air before and after passing through the nose. Our first experiments were very conflicting, but having perfected our methods, our later ones show that nearly all the organisms are arrested before reaching the naso-pharynx.

"We conclude that many of the organisms are arrested by the moist meshwork of the vibrissæ, while those which reach the mucous membrane are eliminated by the action of the ciliated epithelium, and by the trickling of the mucus. The mucus, from our experiments, seems to be an unsuitable nutrient medium, and the multiplication of organisms is thereby prevented. Phagocytosis may occur, but only to a small extent."

Thomson and Hewlett agree with Hildebrandt, that the mucus found in the trachea is always sterile, all germs being arrested in the nasal cavity before the trachea is reached. The experiments made show that bacteria placed upon the membrane of the nose are rapidly removed. A quantity of bacillus prodigiosus was entirely removed within two hours.

These observers do not agree with Wurtz and Lermoyez that the nasal mucus destroys bacteria, but they do not state upon what grounds they base their disagreement, and do not furnish a sufficient explanation for the rapid disappearance of microbes from the nose.

A New Method of Examining Sputum for the Tubercle Bacillus.—Spengler (*Deut. Med. Woch.*, 1895, No. 15) describes a new method for the preparation of sputum in which tubercle bacilli are suspected. He mixes equal volumes of sputum and warm water, rendered feebly alkaline with caustic soda, with 0.1 to 1.0 per cent. of trypsin, and then places the mixture in the incubator. Two or three hours later a small quantity of crystalline carbolic acid is added to prevent putrefaction. As soon as a deposit forms, the supernatant fluid is poured off, the deposit washed with fresh alkaline water, and again placed in the incubator. This process is repeated several times, and finally the sediment is collected upon a filter-paper and dried. Portions are then stained in the usual way.

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AND

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CONCENTRATED MILK.

A WRITER in the *British Medical Journal* has called attention to the value of concentrated milk in certain forms of diarrhea and in wasting disease, and especially in cases in which the patient is unable to take other nourishment, and cannot take a sufficient amount of milk in its ordinary, diluted form to meet the demands of the body. Concentrated milk is prepared by evaporating the milk in a porcelain dish over some suitable heating apparatus, care being taken to see that the liquid does not boil and to stir it continually. By this means cream is prevented from rising, and the evaporation is not delayed by the formation of a skum over the surface. With proper apparatus and attention, milk may be reduced to one half its volume in one hour.

ANCIENT REMEDIES FOR EPILEPSY.

THE following extracts from an ancient medical work give something of an idea of the hardships to which our forefathers were exposed under the name of medical treatment: —

"*Against the Epilepsy.* — As soon as a child is born, and before it takes anything else, if you make it swallow half a scruple of coral in powder, mixed with nurse's milk, it is given for certain that the child will never be afflicted with epilepsy.

"*Another Remedy for the Same.* — Take some wheat flour, that you will mix with dew, gathered on the morning of St. John's day; make of it a cake, which being baked, give it to the patient, and he shall get well.

"*Another for the Same.* — If you cut and open, before the full moon, the young ones of the swallows of the first nest, you will find in their ventricle two small stones, one of which is all of one color, and the other of several colors; before they touch the ground, shut them up in a piece of goat or deer skin, and tie them on the arm and neck; they will cure the patient of the epilepsy, according to the testimony of an Italian doctor, who assures, having made the experiment with it.

"*To Know the Epilepsy.* — To know the epilepsy, burn some deer horns, and the person who is subject to it will fall, but the patient must be surrounded with a blanket or quilt from head to foot, in the manner of a pavilion, in order that the smoke does not get lost."

CONTAGION THROUGH THE MEDIUM OF BOOKS.

THE December number of the *Annales de l' Institut Pasteur* contains an interesting paper by Cazal and Catrin, the purpose of which was to determine the following questions: —

1. Are books carriers of microbes, and especially of pathogenic microbes?

2. Can a book soiled by infectious liquids from a patient suffering from a contagious malady transmit the disease?

3. Is there a practical means by which books may be easily and completely disinfected?

The conclusions reached as the result of numerous experiments in relation to each of these questions were as follows: —

1. That books, even when absolutely new, are not aseptic, but that they do not present pathogenic microbes, the latter being found, however, in old books.

A curious fact noted is that an old book which had been used a long time by the patients of a great hospital, when examined, showed only a single pathogenic microbe, the staphylococcus pyogenes aureus.

2. In experiments relating to the communication of infectious diseases through the medium of books, positive results were obtained for the streptococcus, the pneumococcus, and the diphtheria bacillus, but the results were negative for tuberculosis and typhoid fever.

3. It was found that unbound books could be completely disinfected by exposure to dry heat, but bound books could not be thus disinfected without injury. For this reason it was advised that only unbound books and papers should be used in hospitals.

Malaqua.— Dr. Bachmann, according to the *Journal of the American Medical Association*, insists that the term *malaria* is incorrect, and he has coined a new word, *malaqua*, to take the place of this ancient misnomer. Dr. Bachmann argues that "unless we come in actual contact with the evidence produced in the use of pure water as against that heretofore used, the physician will, in all probability, be very slow to allow himself to be convinced that the word *malaria* (*mal*, bad; *aria*, air) is a misnomer, and that *malaqua* (*mal*, bad; *aqua*, water) is the word that should be used to cover the pernicious effects known under the name of malarial fever.

"The germ which is of soil origin, is strictly a protozoön, and reaches its highest development in low, moist ground with a favorable temperature. Surrounded by the proper soil conditions, this protozoön passes from one stage of life into another with considerable rapidity; so that in the present state of our experimental knowledge, it is impossible to identify it; nor is it probable that by culture we shall be able to produce the accepted Laveran germ outside of the human system.

"As a rule, the potable water from the malarial districts is derived from driven wells not over twenty-two feet deep, in soil with clay or some other impervious substrata, which water is generally cool and palatable, often sparklingly clear, but more frequently a little turbid. This water is filled with an incalculable number of these germs in all stages of development; and if used as a potable water, they naturally find their way into the system through the alimentary channel. This protozoön passes through so many forms or stages of life that in some stages it is light enough to float and be transported by the moist air of low grounds, but in this state it is comparatively harmless except under most extraordinary conditions; it is not until the surface water is used that the real mischief begins, when, by reason of higher development, it has become much more virulent than that floating in the air. A very short period of incubation is sufficient to develop a severe case of malarial fever in the newcomer who uses the surface water.

"From personal observation I know that the exclusive use of pure, deep-seated water affords entire immunity against malaria in sections of country where no white man dared live, using the surface water. Nor must it be understood that the exclusive use of pure water simply fortifies and strengthens the system against the attack of the germ. The water is the primary cause of infection, which acts as the direct carrier of the germ into the system through the intestinal tract."

Chauncey M. Depew on Liquor-Drinking.— Mr. Depew, who has perhaps the greatest reputation of any man in the United States as an after-dinner orator, but who has never posed as a temperance lecturer, recently related the following facts from his own personal observation: "Twenty-five years ago I

knew every man, woman, and child in Peekskill. I was up there last fall, and began to count them over. Some of them have become clerks, some merchants, some manufacturers; others have become lawyers and doctors. It is a remarkable fact that every one of those who drank, is dead; not one is living. Every one who proved a wreck, and ruined his family, did it because of rum. Every one who has been frugal, thrifty, industrious, and church-going, without exception, owns the house in which he lives."

Nutritive Value of Corn-Meal. — Professor Atwater, who has for many years been engaged in investigations relating to foods for the United States Department of Agriculture, has been led to the conclusion, as the result of exhaustive studies on the subject, that, considered from an economical standpoint, corn-meal has the highest nutritive value of all foods. Ten pounds of corn-meal contains more than eight pounds of actual nutriment, while the same quantity of potatoes possesses but three and three-fourths pounds of nutrient material.

We regret to note the recent announcement of the death of Dr. Robert Battey, of Rome, Ga. Dr. Battey obtained great distinction as a physician, especially in connection with the operation of ovariotomy. Though generally supposed to be a native of the Southern States, Dr. Battey was in fact a native of Michigan, being born in the town of Marshall, where he lived until he was a young man.

Napoleon Defeated by a Bad Stomach. — According to a recent writer, Napoleon owed his downfall to an attack of cramp in the stomach. When dictating an order to Vandamme, one of his principal generals, at a critical moment he suddenly stopped, uttered a sharp cry, doubled up like a pocket-knife, and was utterly unable to either think, speak, or act. His inability to put in operation the plan which he had conceived, gave rise to a train of mishaps, the last of which was his utter discomfiture and defeat.

A Wise Law. — The State of New York has a law compelling every city of over fifty thousand inhabitants to equip and maintain free public baths. Smaller towns are urged to raise money for the purpose, although not absolutely required to do so.

Human Manikins. — The *British Medical Journal* calls attention to the evils of cigarette-smoking and the use of tobacco in general upon boys and young men, and declares that schoolboys should be taught that premature indulgence in tobacco, whether in the form of cigarettes or any other, "is likely to make them grow up into manikins rather than men." This idea ought to be impressed upon the mind of every boy and young man in the land, and it ought also to be made clear to older men, that what is bad for a boy of twenty must be bad for a man of twenty-one, twenty-five, or a greater age.

Avoid the Skins of Fruit. — In the Laboratory of Hygiene of the Battle Creek Sanitarium an interesting experiment was recently made for the purpose of determining the influence of the skins of fruit. A young man in whose stomach fluid no microbes whatever were found after a breakfast of sterilized food, was given a quantity of unwashed grapes, which he ate, skins and all. Examination of the stomach fluid showed more than five hundred thousand microbes for each fluid ounce.

Dr. Maria Duncan calls attention to the fact that the bloom of the peach is a luxuriant growth of microbes, which find

in the stomach most favorable conditions for growth and development, thus causing decay of the fruit before it can be digested. This may be an explanation of the fact that many people cannot eat raw fruit. All raw fruit should be thoroughly washed before it is eaten, and the skin carefully removed in such a manner as to avoid soiling the flesh, or pulp, of the fruit.

Medicinal Advertisements.— At its last meeting, the trustees of the American Medical Association instructed the editor of the journal of the Association to accept no advertisements of medicinal preparations, the proprietors of which did not give a formula containing the official or chemic name of each composing ingredient, to be inserted as part of the advertisement. The Medical Society of the State of Pennsylvania, at its recent meeting, endorsed the action of the American Medical Association, and urges upon all journals to follow the example of the Journal of the American Medical Association, in which we heartily concur.

A Sanitary Use for Cows' Horns. —A sanitary argument can now be added to the humanitarian, against the cruel practice of dehorning cattle. The municipal authorities of Rome, Italy, have taken more advanced ground in relation to the protection of the people from infection with tuberculosis through the milk of diseased cows than has been taken by any other public authority. The sanitary regulations of the city of Rome for some time have required an inspection of all milch cows, and this sanitary surveillance has now been extended to the surrounding Campagna. When a cow has been inspected and found to be capable of furnishing good milk, the fact is indicated by a mark placed upon the animal's horns and a license issued to the owners of the animal. No milk except that produced by those inspected and licensed animals is allowed to be sold. The inspection is repeated every year. All cows suspected of tuberculosis are subjected to the tuberculin test described in these columns some months ago, and if found to be diseased, are destroyed. This practice is one which may be well commended to the attention of sanitary authorities everywhere.

Reviews.

A New Work on the Stomach.— A Paris (France) publishing-house has recently issued a new work on the stomach, by Professor G. M. Debove, of the Hospital Andral, Paris, and Professor A. Rémond, of Metz. This work of 430 pages, entitled, "Traite des Maladies de L'Estomac," is the most important and valuable work upon the subject which has yet appeared. Being of a later date than the excellent treatise of Ewald, it presents the subject in the light of the most recent researches, and gives due prominence to the remarkable and interesting facts developed by Hayem and Winter in their painstaking study of the chemical processes of the stomach, which are barely mentioned by Ewald, an oversight for which there seems no other reason than national prejudice, a form of human weakness which scientific men generally manage to rise above. Upon this point, however, we must not speak too positively, as we certainly would not wish to treat unfairly a writer who has done so much in developing methods of precision in diagnosis and therapeutics as has Professor Ewald.

Debove and Rémond are evidently thoroughly familiar with the work of Ewald, as well as with that of all other modern investigators, and they have made their work a most admirable summary of what is known relative to the physiology and pathology of the stomach. The work has the merit of being accurate, precise, and thoroughly scientific, without being so laboriously and painfully technical as to be uninteresting and unnecessarily bulky.

The Modern Medicine Publishing Company have arranged with the editors and publishers for bringing out an English translation of this work, which is now being prepared, and will be issued in the near future. We believe it will be gladly welcomed by the profession everywhere.

The Battle Creek Sanitarium
LABORATORY OF HYGIENE.

J. H. KELLOGG, M. D., Superintendent.
GEO. W. BURLEIGH, M. D., Bacteriologist.
HOWARD RAND, M. D., Urinalist.
A. B. OLSEN, B. S., M. D., Pathologist.
W. A. GEORGE, M. D., Chemist.

Monthly Résumé of Work Done.

REPORT OF EXAMINATION OF BLOOD.

FOR FEBRUARY.

Blood Count.	Men	Women.	Total
Over 5,000,000	6		6
Between 4,500,000 and 5,000,000	44	6	50
" 3,500,000 " 4,500,000	20	64	84
" 3,000,000 " 3,500,000		2	2
Less than 3,000,000		1	1
Totals	70	73	143

Hemoglobin.	Men.	Women.	Total.
100 per cent.	32	11	43
93 " "	21	35	56
85 " "	9	21	30
78 " "	5		5
71 " "	3	3	6
63 " "		2	2
28 " "		1	1
Totals	70	73	143

Gastric Laboratory Report for February.— Total number of examinations made, 129; experimental, 13.

Patients were received from the following States and countries: Michigan, 45; Ohio, 14; Indiana, 12; Illinois, 6; Iowa, 6; South Dakota, 6; Wisconsin, 4; West Virginia, 4; Nebraska, 3; Minnesota, 3; New York, 2; Pennsylvania, 2; South Carolina, 1; Missouri, 1; Kentucky, 1; Washington, 1; Maine, 1; Massachusetts, 1; California, 1; Switzerland, 1; South America, 1.

Microscopical Examination of Sputum for February.— There were 42 examinations made, 31 of which were new cases. Ten cases were found to be tubercular.

Patients were received from the following States: Michigan, 8; Indiana, 1; Kentucky, 1.

Bacteriological Examination of Stomach Fluids. — There have been 103 examinations made, 89 of which were new cases; 7 were repetitions and 7 experimental. In 17 cases the stomach was found to be sterile.

Urinary Report for February.— Number of specimens analyzed, 262; number of cases, 235; number of specimens in which albumin was found, 14; pus, 52; sugar, 8; blood, 4; bile, 2; casts were found 2; toxicities taken, 5; total nitrogens and xanth. worked out, 2.

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PUBLISHERS' DEPARTMENT.

A PHYSICIAN'S OPINION OF GRANOSE.— The following unsolicited testimonial was recently received from Dr. Geo. W. Green, of Battle Creek, Mich., formerly of the well-known firm of Chapman & Green, Manufacturing Pharmacists, Chicago, Ill.: —

"I want to thank some one for the 'Sanitarium Foods' which are produced from the food department of the Sanitarium. I think the thanks of the medical profession are due you for developing these foods. I, with many others who have led busy lives, find much difficulty in digesting starchy foods — they cause fermentation and bad assimilation, yet I cannot do entirely without starch in my diet. In Granola and Granose Flakes I find the starch so modified in your process of preparation, that the impairment of my digestion is entirely relieved. We shall, in the future, make daily use of these two preparations, and incidentally several other of your foods.

"One of the chief pleasures I have in using these preparations is that I believe them absolutely true to formula.

"GEO. W. GREEN, M. D.,
"*Battle Creek, Mich., June 3, 1895.*"

In the note accompanying the above testimonial, Dr. Green kindly says, "If the inclosed indorsement of your foods will be of any benefit to you, you may make use of it as you desire. This is the first time in my life I have ever indorsed anything, and this is entirely unsolicited. I thought the goods had earned anything I could say."

A FOOD CURE FOR CONSTIPATION.— Granose cures constipation. Hundreds of cases might be cited in which the free use of granose at each meal has resulted in the complete cure of chronic constipation of many years' standing. At the Battle Creek Sanitarium its use is one of the chief methods of controlling this very obstinate condition. It is found superior for this purpose to graham bread, cracked wheat, or any other of the whole-grain preparations, and has the additional advantage of not being irritating to the stomach or intestines, a fact which is due to the thorough manner in which the cellulose covering of the grain is broken up.

The use of granose is more than a complete substitute for mineral waters, after-dinner pills, and the various laxatives, liver tonics, etc., which are so largely used to regulate the bowels, and which produce serious disturbances of both the stomach and liver. The habitual use of laxatives is a most pernicious practise, and has ruined the health of thousands.

HOW TO MAKE FAT AND BLOOD.— Bromose and granose constitute an ideal diet for a person who wishes to make a rapid gain in fat and blood. A lady patient at the Battle Creek Sanitarium who had so bad a stomach she could not eat anything else, gained fourteen pounds in fourteen days by eating only bromose and granose. These foods cured her of chronic indigestion in three weeks.

AHEAD OF ALL COMPETITORS.— Granose is often digested when no other food can be retained by the stomach. It is invaluable in extreme cases of indigestion, and seems to be equally useful in hyperpepsia and hypopepsia. One reason why granose is so easy of digestion is, that it never becomes pasty, as do mushes and most other grain preparations. When moistened, it breaks up into exceedingly fine particles, but never forms viscid masses; hence it is very quickly dissolved by the saliva and the gastric juice, which act together upon the food in the stomach.

Caramel-Cereal

FOR THE LAST TWENTY YEARS, has been used by the thousands of invalids who annually visit the great Sanitarium at Battle Creek, Mich.

UNCONSCIOUS POISONING.—An old physician of Chicago remarked the other day: "Thousands of people are poisoning themselves daily with tea and coffee without knowing it. A great number of nervous maladies, and indigestion in various forms, are the result of the deleterious effects of the poison of tea and coffee upon the system. I myself made the discovery a good many years ago, that the headaches from which I had suffered for years, were due to the use of tea and coffee. I found whenever I took a cup of strong coffee, I had a headache as the result, and I had headaches now and then in spite of what I considered my great moderation in the use of tea and coffee. I concluded to dispense with them altogether, and when I did so, my headaches disappeared and did not return. I have cured scores of chronic headaches by forbidding the use of tea and coffee."

CARAMEL-CEREAL is a perfect substitute for tea and coffee. It is aromatic, delicious to the taste, and so nearly resembles coffee as easily to be mistaken for veritable Mocha, although, of course, not by a connoisseur.

For illustrated catalogue and prices, address,

BATTLE CREEK SANITARIUM HEALTH FOOD CO., Battle Creek, Mich.

Farbenfabriken vorm. Friedr. Bayer & Co.'s
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LYCETOL
An alkaline salt of Piperazine, possessing marked properties as a uric acid solvent, and highly commended in cases of gout and lithæmia.

SALOPHEN
A non-toxic, agreeable and effective antirheumatic in acute and chronic cases, and a reliable analgesic in migraine and the neuralgias.

PHENACETINE-BAYER
The safest, most efficient and reliable of antipyretics and analgesics for all acute, inflammatory, febrile conditions and all forms of pain.

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A uric acid solvent and antilithic of acknowledged value in lithæmia, acute and chronic gout, renal lithiasis and colic, and hematuria.

SOMATOSE

Somatose is a concentrated preparation of the nutrient elements of meat, in powder form, which is palatable, well relished, stimulates the appetite, and is readily assimilated. Recommended in fevers and wasting diseases, and as an adjunct in infant feeding

TANNIGEN
An active and innocuous intestinal astringent for diarrhœal affections, both acute and chronic, tasteless, and undecomposed in the stomach.

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A convenient, unirritating and effective antiseptic dressing in general surgery, dentistry, gynecology, diseases of the eye, ear, nose, and in burns.

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A complete substitute for iodoform, non-toxic, agreeable, adhesive, and of especial value in minor surgery, venereal diseases, and dermatology.

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An effective antimycotic in all parasitic diseases of the skin, and a mild stimulant and powerful anti-pruritic in the chronic dermatoses.

TRIONAL
A hypnotic, neurotic and sedative, prompt, safe and serviceable, free from after-effects, and especially suitable for prolonged administration.

SULFONAL-BAYER
A reliable, safe and active hypnotic and nerve sedative, inducing prolonged, physiological sleep, free from narcosis and disagreeable sequelæ.

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The Treatment of Influenza or La Grippe.

It is quite refreshing these days to read of a clearly defined treatment for the grip. But in an article in the *Lancet-Clinic*, December 28th, 1895, Dr. James Hervey Bell, 251 East 32d Street, New York City, says he is convinced that too much medication is both unnecessary and injurious. He has few remedies; prescribes them with confidence; and "trusts the rest to nature."

When called to a case of influenza, the patient is usually seen when the fever is present, as the chill, which occasionally ushers in the disease, has generally passed away. Dr. Bell says he then orders that the bowels be opened freely by some saline draught, as hunyadi water or effervescing citrate of magnesia.

For the high fever, severe headache, pain, and general soreness, the following is ordered:

℞ Antikamnia Tablets (5 gr. each), No. xxx.
Sig. One tablet every two hours.

If the pain is extremely severe, the dose is doubled until relief is obtained. Often this single dose of ten grains of antikamnia is followed with almost complete relief from the suffering. Antikamnia is preferred to the hypodermic use of morphia because it leaves no bad after-effects; and also because it has such marked power to control pain and reduce fever. The author says that unless the attack is a very severe one, the above treatment is sufficient.

After the fever has subsided, the pain, muscular soreness and nervousness generally continue for some time. To relieve these and to meet the indication for a tonic, the following is prescribed:

℞ Antikamnia & Quinine Tablets, No. xxx.
Sig. One tablet three times a day.

This tablet contains two and one-half grains of each of the drugs, and answers every purpose until health is restored.

Occasionally the muscular soreness is the most prominent symptom. In such cases the following combination is preferred to antikamnia alone:

℞ Antikamnia & Salol Tablets, No. xxx.
Sig. One tablet every two hours.

This tablet contains two and one-half grains of each drug.

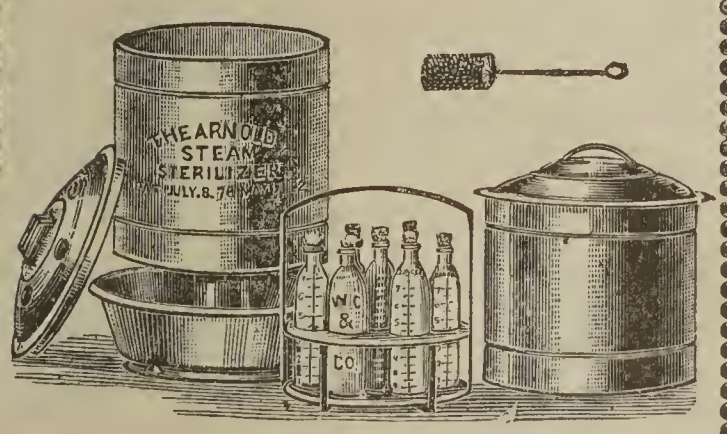
Then again it occurs that the most prominent symptom is an irritative cough. A useful prescription for this is one-fourth of a grain sulphate codeine and four and three-fourths grains antikamnia. Thus:

℞ Antikamnia & Codeine Tablets, No. xxx.
Sig. One tablet every four hours.

Dr. Bell also says that in antikamnia alone we have a remedy sufficient for the treatment of nearly every case, but occasionally one of its combinations meets special conditions. He always instructs patients to crush tablets before taking.

Thousands of Physicians

are now using



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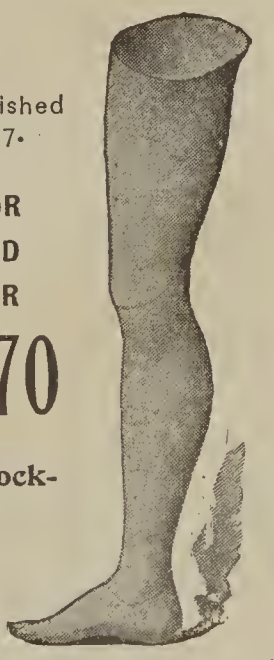

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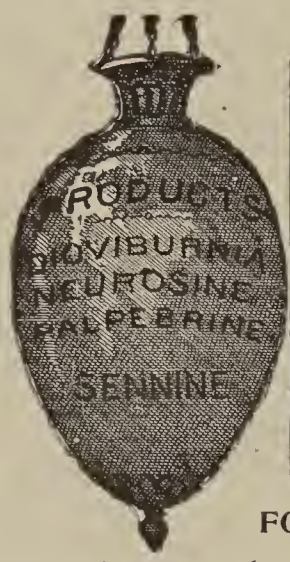

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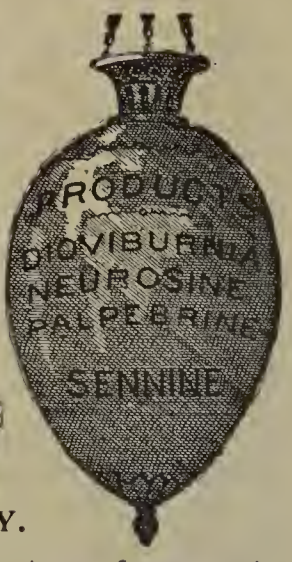

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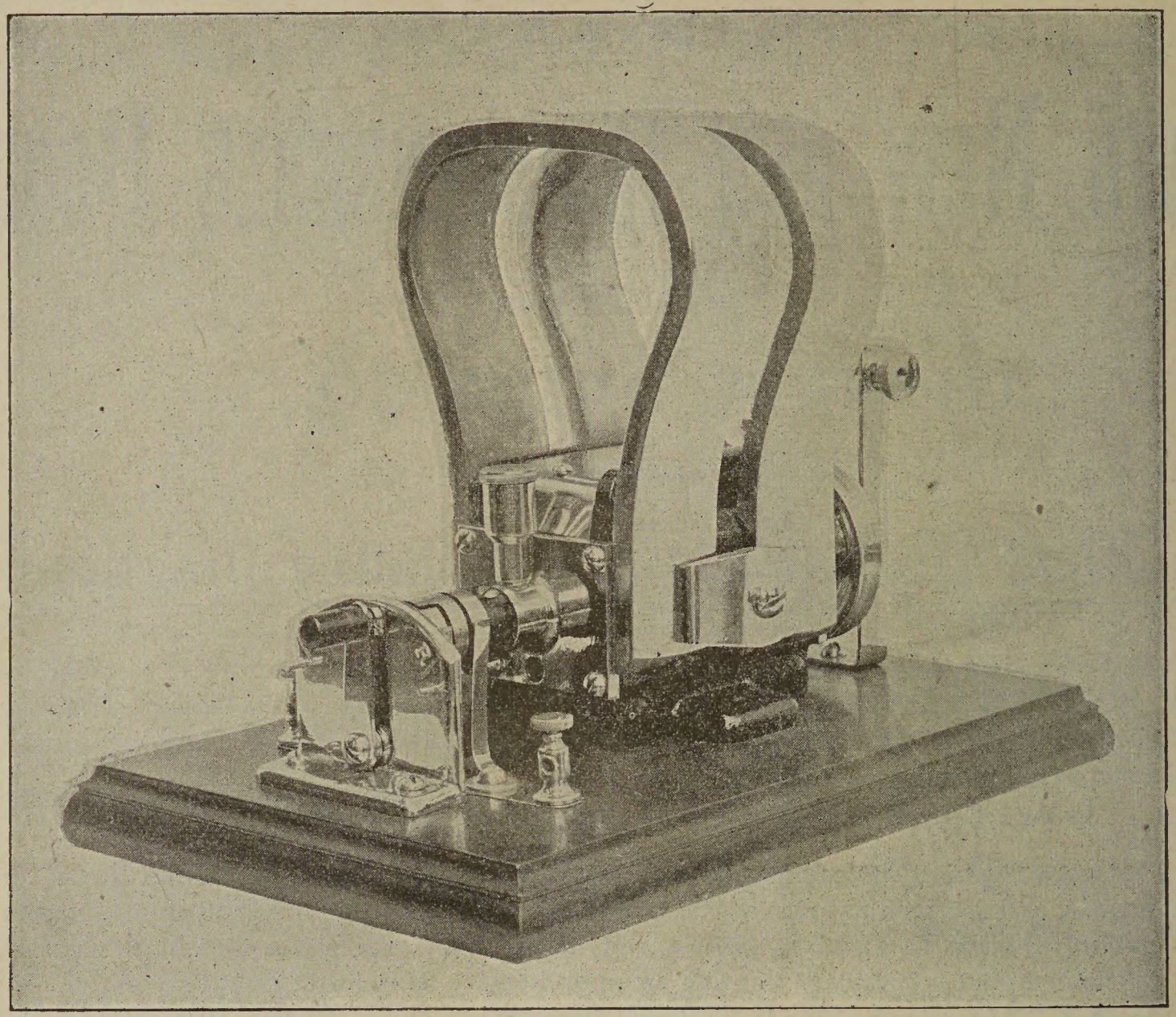

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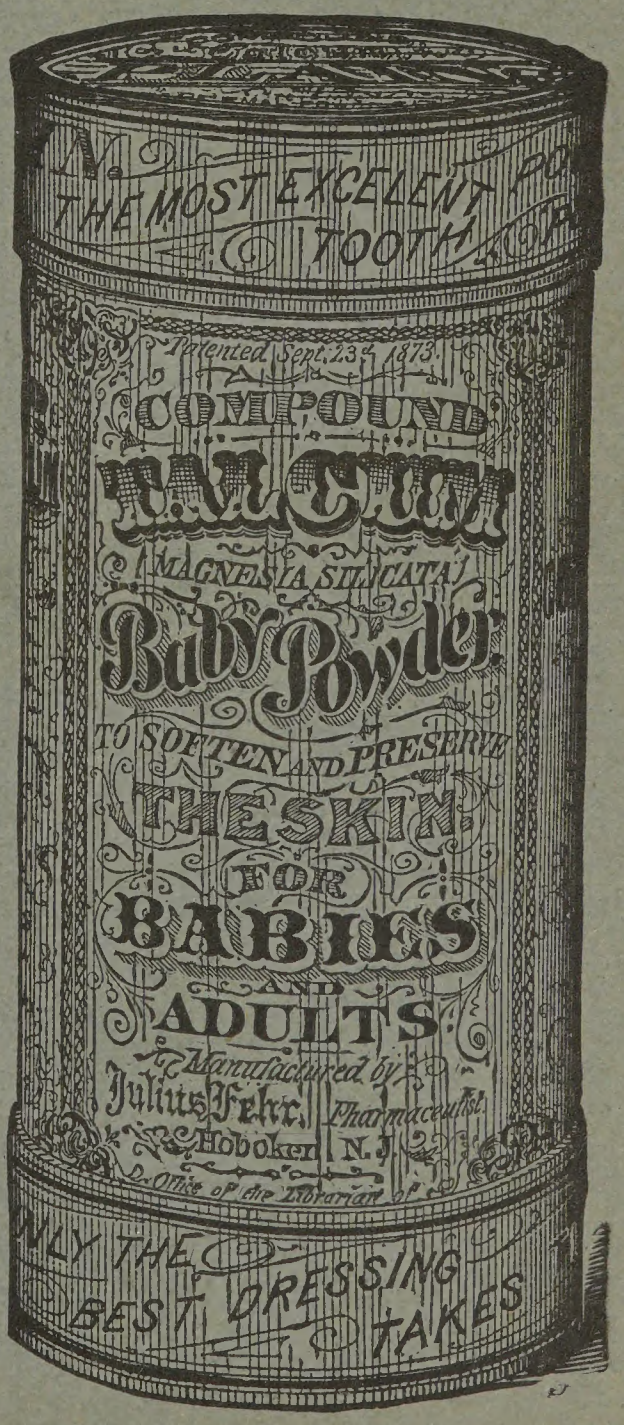

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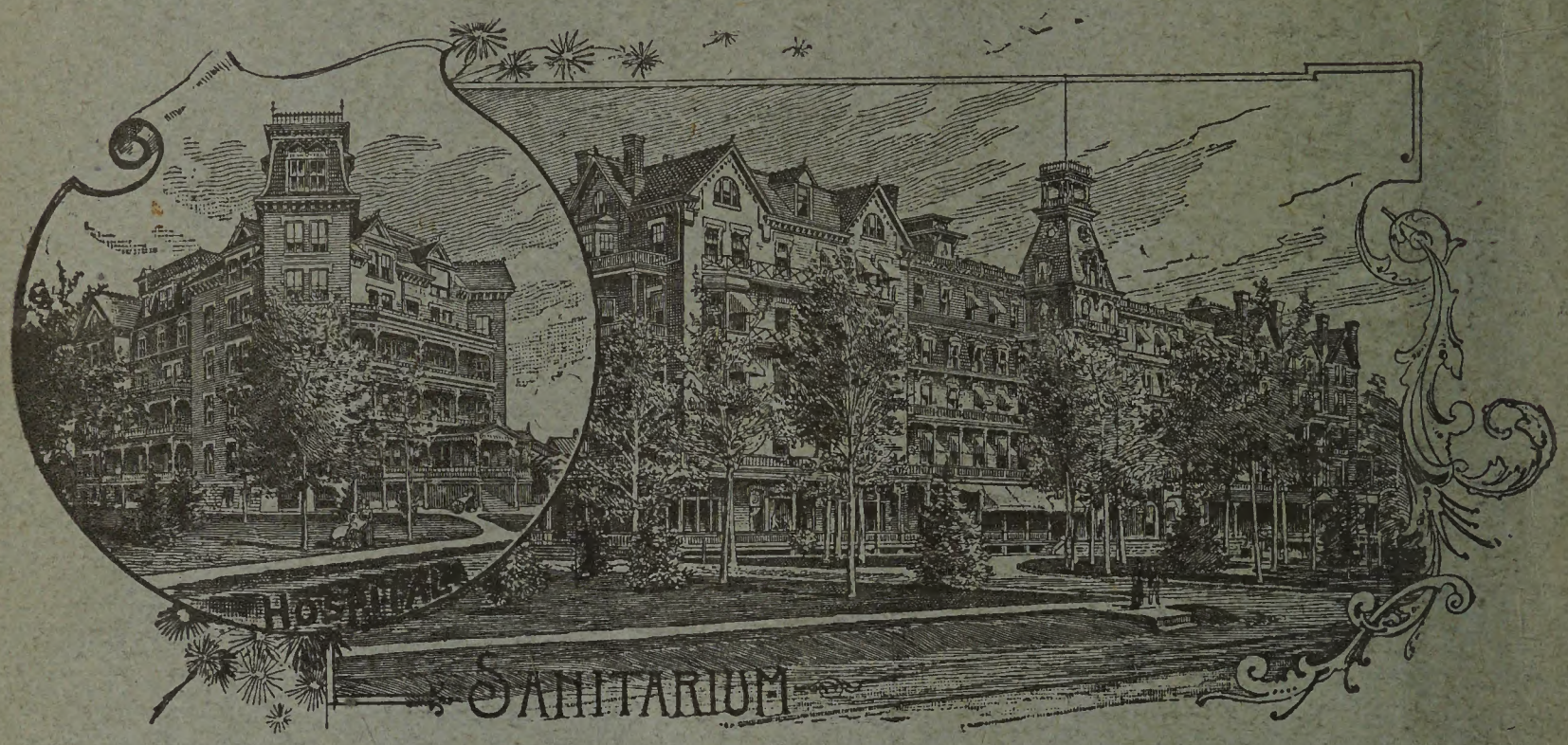

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